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No. 2

SCHWAB'S PASSING.

Now that Charles M. Schwab has passed into practical eclipse there can be no feeling concerning his career than that of pity. This man had the heart of a lion and the energy of thunder, and yet at forty he is practically shelved. Everyone who met him marveled at his natural endowment. He possessed magnificent strength. He had executive and mechanical ability of the highest order, and undoubtedly a fair share of the success of the Carnegie group of enterprises was due to his courage and boldness of initiative. He began his manufacturing career as a stake driver at the age of nineteen, and life was an uninterrupted series of successes until he reached the age of thirty-eight. During that time he passed from stake driver to superintendent, to president of the Carnegie group of works and to the presidency of the United States Steel Corporation. During the time that he was exclusively a Carnegie man he was confined to mechanical work. He had little to do with the financial end of things. He possessed a small interest in the Carnegie enterprises and a large salary, which together constituted a respectable fortune. When the Carnegie plants were taken over at a princely advance over their book value Mr. Schwab profited well and became a very rich man. He looked after the interests of the minority holders of Carnegie stock in a manner which won for him their highest admiration. Undoubtedly it was Mr. Carnegie who procured for him the presidency of the Steel Corporation. Up to this time Mr. Schwab's career had been such as any man might envy. But the presidency of the Steel Corporation appears to have been his undoing. It is undoubtedly an office in which the personal work of the president is an undefined quantity. The Steel Corporation, being only a stockholding concern, the actual work was done by the presidents and executives of the subsidiary companies. That this is true is evidenced by the fact that the earnings of the corporation showed no diminution during Mr. Schwab's prolonged absence in Europe. Schwab during his tenure of office as president of the Carnegie company was ever under the watchful eye of Carnegie himself—and there is abundant evidence that Carnegie kept a tight grip on things notwithstanding his repeated flights to Skibo. Schwab as president of the Steel Corporation was answerable to no individual whatever. He seems to have been corroded by liberty. The first shake which the public had in its confidence of him came from Monte Carlo. Gambling is eminently wrong in a private individual; in Schwab's case it showed lamentable lack of judgment. He was the head of a corporation employing something like 165,000 men and having over 50,000 stockholders. Was he setting an example of rectitude to the men over whom he ruled or was he strengthening the faith of the stockholders in him by such conduct? The Monte Carlo episode distinctly injured Mr. Schwab. But the genius of the man was such that it was speedily forgotten when he returned and resumed the management of affairs. Then after a period of a few months' activity it was suddenly announced that his health had failed and that he was back in Europe again. He scattered money broadcast. He seemed to court notoriety by the most lavish expenditures and started the building of a house in New York city which would do to shelter a dozen kings. Then, alas! the speculative fever seized him. His recent plunges in this regard cannot find commendation in the eyes of the investing public.

Mr. Corey, who succeeds Mr. Schwab, is to devote his time to the practical end of the business. It is understood that he will have nothing to do with the financial part of it. In this connection it may be remarked that the corporation will endeavor to increase the production of all its plants. The pressure on the mills manufacturing rails is shown by the requisition made on the Edgar Thomson Steel Works, the management of which has been notified that the production for July is to be in excess of 70,000 tons, while the best previous record has been 68,500 tons. Mr. Corey's training has been entirely along manufacturing lines.

ANOTHER ATLANTIC GIANT.

The White Star Line, conspicuous among the Atlantic companies in the size and power of its steamships, has just added another giant to its fleet in the Arabic, from the yard of Harland & Wolff at Belfast, Ireland. This splendid steamer, though not quite so large as the Cedric and the Celtic, is one of the greatest craft engaged in Atlantic carrying. She is 600 ft. long, 65 ft. wide, and 44 ft. deep, with a gross tonnage of 15,300 and a displacement of 26,500. The Arabic has luxurious cabin accommodations. Her first-class passengers are provided for amidships, and the second-class passengers have elegant quarters further aft. The third-class passengers have provision made for their comfort which would scarcely have been enjoyed by first-class travelers a quarter of a century ago. Though the Arabic will carry many passengers, she also has the notably large cargo capacity of 16,500 tons. The ship is ventilated by air supplied by electrically-driven fans. There are electric heaters in the first-class staterooms. The Arabic has quadruple-expansion engines of 10,000 H. P., capable of developing a sea speed of about 16 knots. She makes her first eastward voyage from New York, sailing on Friday, July 10. The Arabic, like the other White Star ships, belongs to the great fleet of the International Mercantile Marine Co., the "Morgan merger."

REPORT OF HYACINTH AND MINERVA TRIALS.

The report of the further trials of the boilers of the British cruisers Hyacinth (water-tube) and Minerva (Scotch) was issued last week. It has, of course, already been foreshadowed in the Review. It occupies twenty-four pages and is illustrated by diagrams. It states that the port engine of the Hyacinth broke down Feb. 16, and the vessel accordingly made for Plymouth on Feb. 18. The Minerva completed her passage off St. Catharine's point at midnight and anchored at 1:33 a. m. on Feb. 18, the distance of 1,132.5 miles having been steamed in 61½ hours at an average speed of 18.41 knots.

The results of the passage are shown in tables, the records for the Minerva being for the whole period, while those for the Hyacinth do not extend beyond 7:50 a. m. on the 16th, when the accident occurred. The Hyacinth was averaging about half a knot more than the Minerva. It was reported by the Minerva that when passing Tarifa (1634 miles from Gibraltar) the Hyacinth was leading by 35 minutes; further, that in the next 176½ miles she increased this lead to 47½ minutes. At the latter portion of this period of the run the heating of the port engine of the Hyacinth occurred, and after passing St. Vincent the engines were eased till the power developed was 8,000 I. H. P., the Minerva then developing 8,640 I. H. P. As a consequence, when passing the Burlings, 148½ miles from St. Vincent, the Hyacinth had gained only another 2½ minutes, the Minerva reporting her as then being 50 minutes ahead. After the port engine of the Hyacinth broke down the ship proceeded at slow speed. From the time taken by the Minerva to overhaul and pass her, it is estimated that at the time of the breakdown the Hyacinth was leading by about 17 miles, of which about 9 miles were due to the time gained in getting under way at Gibraltar. Beyond a few slight leaks in the boilers, probably due to such rapid raising of steam, no trouble was experienced with either the machinery or boilers of the Minerva. As regards the boilers of the Hyacinth, no defects of consequence have been discovered. No engine defects are reported from the Minerva.

SILVER SERVICE FOR CRUISER PENNSYLVANIA.

One of the most complete and valuable silver services ever designed is that to be presented to the United States armored cruiser Pennsylvania by the state of Pennsylvania. The set will consist of 162 pieces and will weigh 1,000 lbs. The price of the service will be $25,000. Contract for it has been awarded to J. E. Caldwell & Co. of Philadelphia and will require about one year to complete. The order was secured on merit of design in competition and the award was made by the commission appointed by the state, composed of Gov. Pennypacker and Senators M. S. Quay and Boies Penrose. The centerpiece of the service, 45 in. in length and 24 in. high, will be a receptacle for fruit and flowers and will bear electric lights. The center bowl will be movable, and is designed so as to be lifted from its position and used as a small punch bowl. This bowl is mounted on an immense mass of silver, which supports on both sides of the flower bowl the electric light shades. The base of the whole piece is decorated in high relief with scenes representing the early life of Pennsylvania, and with engravings of William Penn and Benjamin Franklin. The flower bowl has two panels, one on each side, and two handles. On one of these panels is an etching of the cruiser Pennsylvania, and on the opposite side is an etching of the old line ship Pennsylvania, launched in 1837. These etchings are designed to show the advance in naval architecture in the last sixty-five years. Immediately beneath the bowl is the American eagle, whose spreading wings cover the top of a large panel, on which is etched the scene of William Penn making his treaty with the Indians. On the opposite side of the piece, beneath an eagle similarly placed, is an etching of the state capitol building at Harrisburg. The electric light holders are richly ornamented, and on one side have the seal of the state, while on the other side is the seal of the navy. The entire base of the piece is in high relief and depicts the ruler of the sea, Neptune, in his chariot drawn by sea horses, with mermaids in attendance. This part of the piece is to typify the strength and woe of the ocean, and to make the decoration in harmony with the naval character of the object for which it is intended. The total weight of the centerpiece alone will be about 3,000 ounces.

Geo. A. Kolb, prominently connected with the Marine Engineers' Beneficial Association in New York, and was said to have become unbalanced in mind during the recent strike of engineers, died suddenly at his home in New York Tuesday.

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CUNARD COMPANY AND MORGAN COMBINE.

A Fight Between them is Looked for in Shipping Circles on the Other Side of the Atlantic—Interesting Statistics Regarding Ship Yard Labor—Scotch Shipping Letter.

Glasgow, June 30.—The air has been thick with rumors about the difficulties and complications of the United States Ship Building Co. and the Morgan shipping combine, which in the British mind are intimately co-related, but of course not rightfully so. Doubtless Mr. Morgan can look after his own interests in shipping, but as regards ship building it is noted here that neither the organization presided over by Mr. Nixon nor the Cramp company seem to have been able to make good business out of the building of ships, although at costs admittedly much higher than those in Great Britain. Our ship builders are naturally anxious to know "why this thusness?" Ship building is not very active or prosperous here just now, but at all events it is not impoverishing. The costs, too, are coming down, for although in Glasgow the price of steel ship plates has been put up to £5 17s. 6d., less 5 per cent., the price in the north of England has been reduced to £5 15s., less 2 per cent. Other items also are lower, and coal is on the down-grade, but on the other hand freights are in a deplorably low condition, and the impending rate war in the Atlantic trade will not improve matters. It has all along been thought here that a stiff stand-up fight between the Cunard company and the Morgan combine was only a question of time. It seems now about to come off.

The latest White Star liner, the Arabic, has been handed over by the builders. The Arabic, which follows closely the lines of the Cedric and the Celtic, though of somewhat less tonnage, will be joined with these vessels and the Cymric in constituting the Friday service of the White Star line, the Wednesday service consisting of the Oceanic, Majestic, Teutonic and Germanic. The company will then be in a position, whenever the demand for accommodation requires it, to despatch a large modern steamer of the intermediate type each week from Liverpool to New York, in addition to its Wednesday mail sailing. The dimensions of the Arabic are: Length between perpendiculars, 600 ft.; breadth, 65 ft.; depth, 44 ft.; with a gross tonnage of about 15,300. With the exception of actual size, the similarity between the Arabic and the steamers named, and particularly in regard to the passenger accommodation, is marked. The Arabic is a four-masted twin-screw steamer with one funnel, is fitted with quadruple-expansion engines on the balanced principle, which practically does away with vibration. She will steam about 16 knots. She will carry 350 first-class, 200 second-class, and 1,000 third-class passengers, and the accommodation has been modeled on the lines of the Celtic and Cedric, experience having shown those arrangements to be most acceptable to travelers. The White Star fleet now consists of twenty-seven steamers aggregating 280,000 tons, of which twenty-two are twin screw. It is claimed that its average tonnage per steamer is considerably larger than that of any other company, this being accounted for by the fact that it possesses as many as fourteen steamers, each over 10,000 tons, and amongst them the two largest vessels in the world.

INTERESTING STATISTICS AS TO WAGES.

The trouble with trades unions in America will render the following information about wages, etc., in this country of interest. The Clyde Engineers' Association comprises in its membership practically the whole of the marine and general engineering industry in the Clyde district. In their engineering departments the members of this association employ about 16,000 journeymen and apprentices. The principal trades are engineers (fitters, turners, etc.), patternmakers, brass workers and blacksmiths. The majority rates are as follows: Engineers (fitters and turners), 7.75d. per hour; machinemen, 5d. to 9d. per hour; patternmakers, 8.25d. to 8.50d. per hour, brass finishers, 7.75d. per hour; brass molders, 8d. to 8.25d. per hour; blacksmiths, 7.75d. to 8.25d. per hour; sheet metal workers, 8.25d. to 9d. per hour; enginemen, cranemen, firemen, 4.50d. to 5.50d. per hour; and laborers, 4d. per hour. For the period from January, 1899, to March, 1900, the percentages of lost time for engineers proper varied from 3.93 to 4.79 per cent. on average; patternmakers, from 3.25 to 3.90 per cent. on average; brass finishers, from 4.29 to 5.04 per cent. on average; brass molders, from 5.27 to 6.76 per cent. on average; and blacksmiths, from 3.93 to 4.33 per cent. on average. The men employed in engine shops number 12,000 journeymen and 4,000 apprentices. These figures include about 1,800 laborers. The majority rate for laborers is 4d. per hour. There are 4.20 per cent. under 3¾d. per hour, and 13.70 per cent. at 3¾d. Some of these men earn up to 6d. per hour, and some earn under 17s. per week. The members of the association also employ in their boiler shops over 5,000 journeymen and apprentices. The principal trades are platers, riveters, caulkers, blacksmiths, angle iron smiths. The majority rates are as follows: Platers (heavy), 9.2d. per hour; platers (light), 8.50d. per hour; riveters and caulkers, 8d. per hour; angle smiths, 9.25d. per hour; blacksmiths, 8d. per hour; machinemen, 4.25d. to 9.75d. per hour; enginemen, cranemen, firemen, 4d. to 6d. per hour; hammermen, helpers and laborers, 4d. to 5d. per hour. Boilermakers on piece earn on the average not less than £3 per week. Out of the 5,000 employed there are 4,400 journeymen and 700 apprentices. The majority of the men who earn about 17s. per week have no families. They are either old men past their best, or young men just starting, who in time may graduate as platers' helpers. For the period from January, 1899, to March, 1900, the percentages of lost time were: Platers, 7.72 to 8.99 per cent. on average; riveters and caulkers, 7.68 to 8.07 per cent. on average; holders-on, 8.85 to 9.62 per cent. on average; blacksmiths, 3.21 to 4.81 per cent. on average; and angle smiths, 8.08 to 12.87 per cent. on average. The angle smiths belong to the "black squad," but the blacksmith is a member of the Associated Blacksmiths' Society.

Following are the wages of unskilled men: Ship yard laborers, 24.77 per cent. at majority rate, 4d. per hour (22.82 per cent. under majority rate, 52.41 over majority rate); engine shop laborers, 26.31 per cent. at majority rate, 4d. per hour (17.90 per cent. under majority rate, 55.79 per cent. over majority rate); boiler shop laborers, 52.48 per cent. at majority rate, 4d. per hour (25.52 per cent. under majority rate, 22.00 per cent. over majority rate); time hammermen (ship yard), 43.74 per cent. at majority rate, 4.75d. per hour (40.08 per cent. under majority rate, 16.18 per cent. over majority rate); time hammermen (boiler shop), 42.24 per cent. at majority rate, 4.75d. per hour (35.54 per cent. under majority rate, 22.22 per cent. over majority rate); platers' helpers (boiler shop), 24.00 per cent. at majority rate, 4.50d. per hour (42.58 per cent. under majority rate, 32.82 per cent. over majority rate).

The following shows the fluctuations in wages in the Clyde district since 1890. Ship yard iron workers—Five advances, equal to 20 per cent. on piece and 1¼d. per hour; reductions, four on piece, equal to 20 per cent., three on time, equal to ¾d. per hour. Shipwrights—Four advances, equal to 1d. per hour, and three reductions, equal to ¾d. per hour. Joiners—Five advances, equal to 1¼d. per hour, and two reductions, equal to ½d. per hour. Blacksmiths—Five advances, equal to 1¼d. per hour, and three reductions, equal to ¾d. per hour. Blacksmiths in engine and boiler shops.—Four advances, equal to 1¼d. per hour, and two reductions, equal to ½d. per hour. Boilermakers.—Five advances, equal to 1¼d. per hour, and two reductions, equal to ½d. per hour. Engineers—Five advances, equal to 1½d. per hour, and (plus a further equalizing advance of ¼d. per hour) two reductions, equal to ½d. per hour.

BUILDING UP OF SPANISH NAVY.

A proposal in connection with the building up of the Spanish navy is now before the government of Spain, although it is doubtful if it will secure official recognition. A group of bankers and of capitalists has proposed to the government to provide a sum of £28,000,000, which is to be utilized in taking over the arsenals of the state and the existing staff, and in the construction of the greater part of the new naval program. The money is to be repaid in equal proportions within a period of twenty years.

The Scottish Court of Sessions has just confirmed the decision of a lower court in an action brought by the Spanish minister of marine against the Clydebank Engineering Co. of Clydebank (Glasgow) and the liquidators thereof, for the payment of £75,500 damages in respect of delay in delivering four torpedo boat destroyers ordered from the defenders and required for service in Cuba during the Spanish-American war, and which were not delivered on time. The Spanish officials had taken the precaution of making a short time limit the feature of their contract with the Clydebank company; with this end in view they had agreed to pay a price largely in excess of that asked by high-class firms of equal repute with the defenders, and the defenders themselves had named the sum of £500 a week as compensation for failure to deliver by the time stipulated. As delivery did not take place until long after the stipulated time, and as the Clydebank company had no good answer to the claim, damages were awarded in the sum of £67,000. The Clydebank company is now in voluntary liquidation, the works having been acquired by John Brown & Co.

DULUTH GRAIN FREIGHTS.

Duluth, Minn., July 8.—There is little of encouragement for vessel men in grain freights at this point. An occasional jag of grain in a line boat is all that is going out. To add to the difficulties of the situation there is, and has been for a few days, a free offering of Canadian vessel capacity to load at Duluth for export. It appears that the movement from Port Arthur and Fort William, which has been sufficient until now to fairly well absorb Canadian bottoms, even though their number is growing rapidly, is over for the crop, and there is nothing of consequence to move from there till the crop of 1903 is received at lake ports. With a good crop business will be brisk towards fall, but just now there is nothing here to be moved. There are only 1,546,000 bu. of wheat and 2,933,454 bu. of flax in store at the head of the lakes. Though local mills last week took 44,000 bu. of wheat from store, the stocks decreased only 24,000 bu. A rather surprising sale on Monday was 80,000 bu. of wheat for shipment to an eastern mill, the price paid for the lot being the highest on the crop and the highest premium known for a long time. This wheat actually sold here at 8 cents a bushel above September option, at 84 cents a bushel at Duluth. It will have cost the eastern mill, delivered in Buffalo elevator, more than 86½ cents. Flax deliveries on July 1 were chiefly for shipment by lake and for export, and some of this will be moving forward soon. Oats are being shipped fairly well. Last week 177,000 bu. went out by lake.

The Spedden Ship Building Co., Baltimore, Md., has received an order to build a sea-going tug 130 ft. long, 25 ft. beam and 14 ft. deep for the American Towing and Lighterage Co. of Baltimore.

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PACIFIC CABLE COMPLETED.

The new Pacific cable has been officially opened for business. On Saturday last President Roosevelt sent the first message that has actually circumnavigated the globe. The cable building at Oyster Bay was decorated from top to bottom to celebrate the opening of the new cable. The entrance to the building was arched with an artistic arrangement of the national colors. To give an historic surrounding to the first message sent under the Pacific the officials of the Postal Telegraph Co. arranged that one section of the wire over which the president's message should travel would be made up of pieces of wire which are identified with the development of telegraphic, telephonic and power transmission from the time when Morse demonstrated the practicability of his invention. This historical section consisted of portions of the wire over which Morse sent his first message, of the wire over which Bell transmitted his first telephone message, a section of the first cable used by Cyrus W. Field to communicate with Europe under the Atlantic, a strip of the wire used by Edison when he lighted his first incandescent lamp from an electrical lighting station, a section of the wire through which the current was sent to Richmond, Va., to provide motive power for the first trolley railroad, a strip of the wire through which the current of electricity was sent by President Cleveland when he opened the world's fair in Chicago, and a section of the cable used to carry the first current of electricity from the power plant at Niagara Falls.

The message sent by President Roosevelt is in fact the first that has really gone around the world. In 1896, when he opened the National Electrical Exposition at the Grand Central Palace, Senator Chauncey M. Depew sent a dispatch which was supposed to have traveled around the globe. As a matter of fact, however, it went to San Francisco, came back through New York, to India, China and Japan, whence it was returned to New York. The time of transmission was 50 minutes, which was regarded then as a wonderful achievement.

The course that was followed by the president's message was a complete circumnavigation of the world. From Oyster Bay the message sped to San Francisco, then by the new cable to Honolulu, then through the stations at Midway island, Guam and Manila to Hong Kong. From Hong Kong it was sent along wires and cables already established to the Azores, where it was taken up again by the Commercial cables and forwarded to New York.

The laying at Honolulu of the last section of the Pacific cable brought to a successful end a great and difficult enterprise in ocean telegraphy. Prior to the completion of the new cable a message from this country to Manila had to traverse a zig-zag course, which took in Portugal, Egypt, India and China, requiring fifteen separate transmissions and covering a distance of 14,000 miles. For this service to the Philippines the American government was paying about $400,000 a year. The need for a Pacific cable was dwelt upon by President McKinley in a message to congress in February, 1899. Congress hesitated to undertake the work, but in 1901 John W. Mackay offered to lay a cable without subsidy or guarantee. His proposal was accepted, and the new cable line was begun on Dec. 18 last year, when the steamship Silverton began paying out the cable from San Francisco to Honolulu. The new route, as mapped out, had four great ocean stretches, the first 2,276 miles long, between San Francisco and Hawaii; the second, 1,254 miles, from Hawaii to Midway island; the third, a stretch of 2,593 miles, from Midway island to Guam, while the fourth section was one of 1,490 miles from Guam to Luzon. Different steamships were chartered for the laying of the cable between these four points, and with the arrival on Saturday last of the steamship Anglia at Honolulu, after laying the Midway island-Hawaii section, was marked the completion of the task of sinking an 8,000-mile cable under the Pacific.

While W. H. Baker, vice-president of the Commercial Cable Co., was waiting Saturday night for information of the splicing of the last strands of the new cable, which will permit the sending of a message around the world in about an hour's time, he pointed out the apparent paradox which this achievement will bring about.

"I have made out a table," he said, "showing the times at which a cable dispatch sent around the world by the new cable would pass the transmission stations. A message starting from New York at 5 o'clock this morning would reach Honolulu at 11 p. m. yesterday; would get to Midway island at 10 p. m. yesterday, to Guam at 7 p. m. today, to Manila at 6 p. m. today, would reach India at 3 o'clock this afternoon and would get back to New York at about 6 o'clock this morning. Thus the message, although leaving New York today, would have made a trip into yesterday. Similarly, if a dispatch was sent eastward today, it would reach Guam tomorrow and yet be back in New York within an hour after it was sent away today."

Christie & Lowe of Chicago bid $2,175,896.60 and Charles Clark & Co. of Galveston bid $2,471,386.30 for the construction of jetties at the southwest pass of the Mississippi river. The congressional appropriation for this purpose was $2,750,000. Southwest pass is one of the outlets of the Mississippi river. It is about 15 miles in length. The work contemplated under the specifications is for the completion across the bar at southwest pass of an east jetty about 4 miles in length and a west jetty about 3 miles in length, to be constructed of brush mattresses weighted with stone and concrete. The entire work is to be completed within four years.

SUEZ CANAL STATISTICS.

According to a parliamentary return just issued in London the net tonnage passing through the Suez canal for the past year shows an increase of 424,573 tons as compared with that of 1901, and of 1,510,261 tons as compared with that of 1900. The transit receipts for 1902 amounted to 103,720,020 francs and were higher than in any previous year since the opening of the canal, showing an increase of 3,333,623 francs, as compared with those of 1901. The British Suez canal directors remark that no special reason can be assigned for the increase in the trade through the canal except that the economical situation of India has recently improved, and that there has been an increased activity in the trade with the east. The number of vessels which passed through the canal was 3,441 in 1900, 3,699 in 1901, and 3,708 in 1902, of which 1,935 in 1900, 2,075 in 1901, and 2,165 in 1902, carried the British flag. There was an increase last year as compared with 1901 in the tonnage of British vessels which amounted to 5,605,421 tons in 1900, 6,252,819 tons in 1901, and 6,772,911 tons in 1902. During the same period the tonnage of German vessels fluctuated from 1,466,391 tons in 1900 to 1,762,624 in 1901, and 1,707,322 tons in 1902. Of 2,738 merchant vessels and vessels in ballast, of a net tonnage of 8,061,483 tons, passed through the canal in 1902, 1,906 ships of a net tonnage of 5,848,460 tons were British, being 67.7 per cent. of the number and fully 72.5 per cent. of the tonnage; 332, or 12.2 per cent., were German vessels whose tonnage was 13.3 per cent. of the whole; France, Holland, Austria-Hungary and Russia, combined, furnishing a total of 13.2 per cent. of the vessels, and 11.5 per cent. of the tonnage of the carrying trade to the east through the Suez canal. In the ten years, 1891-1900, the annual net tonnage ranged from 8,698,777 tons to 9,738,152 tons, and the transit receipts from 83,422,101 francs to 90,623,608 francs. The average of the net tonnage was 8,588,947 tons, and of the transit receipts 80,006,013 francs, while in 1902 the net tonnage amounted to 11,248,413 tons, and the transit receipts to 103,720,020 francs. The mean net tonnage per vessel, which in 1881 was only 1,517 tons, rose from 2,067 tons in 1891 to 2,830 tons in 1900, to 2,926 tons in 1901, and to 3,034 tons in 1902. During last year the canal was used thirty-nine times by steamers exceeding 150 meters (492 ft.) in length, or more than 18 meters (59 ft.) in breadth. The number of troops carried through the canal during last year amounted to 89,946, as against 136,514 in 1901, being a decrease of 51,568. There was an increase on 8,528 British, 272 American, and 130 Portuguese, against a decrease of 21,597 Russian, 17,677 German, 13,433 Turkish, 6,743 French, 600 Italian, 245 Japanese, and 176 Dutch troops, as compared with 1901. The number of civilian passengers amounted to 98,213 in 1902, as against 92,046 in the preceding year, being an increase of 6,167, while the number of pilgrims, emigrants and convicts was 40,499 in 1902, as compared with 41,661 in 1901, or a decrease of 1,162. In the year 1870, 26,758 civil and military passengers were carried through the canal; in 1880, the number rose to 98,900; in 1890, to 161,352; and in 1902, to 223,775, as against 270,221 in 1901.

NEW EUROPEAN-MEXICAN STEAMSHIP SERVICE.

W. W. Canada, consul to Vera Cruz, in a communication to the state department, says of the new European-Mexican steamship line:

"The Hamburg-American line has inaugurated a special fast freight and passenger steamship service between Hamburg and Vera Cruz, via Havre, Corunna, Habana and Tampico. The vessels range in tonnage from 5,600 to 6,030 tons, are furnished with quadruple-expansion engines, and have an average speed of from 13½ to 14½ knots. They are provided with modern conveniences and have been specially fitted with a view to the comfort of the passengers in the tropical service. The largest vessel of the fleet of three will draw, when fully loaded, 24 ft. The service is monthly; a vessel leaves Hamburg on the 26th of the month, Havre on the 29th, Corunna on the 1st of the following month and arrives at Habana on the 14th and at Vera Cruz on the 17th, where it will remain for about a week. It then proceeds to Tampico, arriving on the 25th. On the 29th the boat leaves Tampico on her return trip, leaving Vera Cruz the 1st of the succeeding month and Habana on the 5th, arriving at Corunna on the 18th, at Havre on the 20th, and at Hamburg on the 24th, making the round trip in about two months.

Another new steamship line, to be known as the Austro-American, has recently been established by the Austrian Lloyd of Triests, for service between Adriatic, Mediterranean and Mexican gulf ports. The Lloyd company, which operates a fleet of twenty steamers, intends to have a monthly service of steamers ranging from 3,550 to 6,400 gross tons each. No time-table has yet been issued, nor is it possible at present to obtain freight and passenger rates.

The first vessel to arrive at Vera Cruz was the steamship Anna of 3,550 tons, which left Trieste March 10, calling at Genoa, Marseilles, Barcelona, Tampico and Vera Cruz; on the return voyage touching at Progreso. The company advertises to receive freight from Mexico for Trieste and Mediterranean ports; also cargo for ports on the continent, with transhipments to other vessels of the same line at Curacao.

C. Christensen of Scranton, Miss., has just finished a tug for Lee Kimball of Mobile, Ala. The tug is 105 ft. long, 22½ ft. wide and 11 ft. deep. The engine is a fore-and-aft compound with cylinders of 16 and 22 in. diameter by 22 in. stroke, supplied with steam from a cylindrical return-tubular boiler of 10 ft. diameter and 11 ft. length.

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SHIP BUILDING IN THE UNITED STATES.

Returns for the year ended with the first of the present month—Quite a falling-off in the Lake output compared with the previous year—Outlook not encouraging.

During the fiscal year ended June 30, 1903, the bureau of navigation states that 1,536 vessels of 456,076 gross tons were built in the United States and officially numbered, compared with 1,057 vessels of 473,981 gross tons for the previous fiscal year. Returns of vessels under construction on July 1, 1903, in the United States indicate for the new fiscal year an output below that of the year just ended.

The world's shipbuilding reached its highest point in 1901. The diminished output since then has been less noticeable in the United States than abroad. Thus, Lloyd's latest returns show that on March 31, 1903, in the United Kingdom 425 vessels of 974,680 tons were under construction, compared with 431 vessels of 1,240,344 tons for the same day in 1902.

The principal decrease in the United States for the past year has been in steel steamers built on the great lakes, which numbered forty-one of 131,000 tons, compared with fifty-two of 161,797 tons, for the fiscal year 1901-2.

The only item of considerable increase has been the cheaper forms of construction—unrigged canal boats, barges, etc.—numbering 320 of 79,574 tons, compared with 297 of 57,502 tons, for the previous year.

Nearly two-thirds of the year's output consists of ninety-two vessels, of over 1,000 tons each, aggregating 295,548 gross tons. Of these the great lakes' yards built thirty-seven steel steamers, aggregating 130,283 gross tons, four of which, aggregating 7,147 tons, are built to pass through the Welland canal for ocean coasting service. Three lake steamers, James H. Reed, D. G. Kerr and D. M. Clemson, each slightly exceeds 5,500 tons.

On the seaboard eighteen ocean steel steamers of 101,471 gross tons were built, the largest output of this type in our history. The large vessels of this type, contracted for in 1900, are now completed or will be completed, barring strikes or unforseen delays, in the early spring and summer. No new contracts for this type have been made in two years. The year's additions were the Finland of 12,700 tons—the largest vessel built in the United States this year—and the Mississippi, Maine and Massachusetts, each of 7,913 tons, all four for the International Mercantile Marine Co.; the Siberia, 11,284 tons, for the Hawaiian-Asiatic trade of the Pacific Mail, and the Arizonian and Texan, over 8,600 tons each, for the American-Hawaiian Co. Other steamers are for the coasting trade, of which four steamers of 12,974 tons, carrying oil in bulk, are noteworthy.

Two barkentines for Pacific trade, aggregating 2,638 tons, were the additions to the square-rigged fleet. The new wooden schooners over 1,000 tons numbered twenty-one, aggregating 30,537 tons. The steel schooner Thomas W. Lawson of 5,218 tons was documented early in the year.

Other new vessels over 1,000 tons are three wooden steamers, aggregating 4,605 tons; three ferry and river steel steamboats, aggregating 3,849 tons, and seven rigged barges of 10,947 tons.

The following table shows the output, both in wood and steel, of the several districts during the year ended June 30, 1903:

	WOOD.				STEEL.				TOTAL.	
	SAIL.		STEAM.		SAIL.		STEAM.			
	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.
Atlantic and gulf.	462	52,795	260	15,089	7	12,541	59	106,796	788	187,221
Porto Rico	10	112	..	..	..	..	..	..	10	112
Pacific	51	18,542	102	11,046	..	..	5	10,493	158	40,081
Hawaii	1	6	2	16	..	..	..	..	3	22
Great Lakes	16	5,660	52	2,794	..	..	41	131,660	109	140,114
Western rivers.	1	11	140	5,985	..	..	6	2,956	147	8,952
Total	541	77,126	556	34 930	7	12,541	111	251,905	1215	376,502

During the corresponding year, ended June 30, 1902, the output of the ship yards was as follows:

	WOOD.				STEEL.				TOTAL.	
	SAIL.		STEAM.		SAIL.		STEAM.			
	No.	Gross tons.	No.	Gross tons	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.
Atlantic and Gulf	583	65,265	260	19,021	8	9,223	62	102,647	943	196,156
Porto Rico	5	89	..	..	..	..	..	..	5	89
Pacific	47	26,472	90	9,725	..	..	2	10,707	139	46,604
Hawaii	1	9	1	13	..	..	..	..	2	22
Great Lakes	8	209	65	3,242	..	..	52	161,797	125	165,239
Western Rivers	6	114	134	7,927	..	..	6	328	146	8,369
Total	650	91,849	580	39 928	8	9,223	122	275,479	1360	416,479

Note—Unrigged vessels (canal boats, barges, etc.) built during the year ended June 30, 1903, numbered 320 of 79,574 tons; year ended June 30, 1902, 279 of 57,502 tons.

FIRST IRON SAILING SHIP.

Some interesting facts have been published in England concerning the first iron sailing ship which set out from Liverpool, says a recent issue of the Scientific American. The vessel with this unique distinction was the Richard Cobden, commanded by Thomas Lidbitter. This craft was built of Coalbrookdale iron, and was launched in 1844. She was a bark of 461 tons, and had a speed of 10 knots per hour. She was constructed of iron throughout, including the rudder, rudder frame and steering gear. Her lines were very fine, and she was five times her beam in length. She was without bulkheads, and in sailing trim she lay on an even keel. She had a great rise of floor, falling in somewhat from her bilge to the rails. In 1844-45 she set sail for China, but was laid up twice for repairs at Cork and Rio Janeiro respectively during the passage. She aroused considerable attention at the various ports at which she called, as she was the first iron vessel ever seen, and was regarded somewhat suspiciously by the superstitious, to whom the idea of making iron float was considered as flying in the face of Providence. Her second voyage was to Bombay by way of the Cape of Good Hope and back. She covered the round trip in some seven months, which was considered a remarkable performance. She made another journey to Bombay, which was reached in 94 days. On none of these trips did the vessel make any water, so that the feasibility of utilizing iron for vessels was firmly established.

The next vessel commanded by Capt. Lidbitter was also an iron vessel, launched in 1853. She was 102 ft. in length, 32 ft. beam, and 22 ft. depth. She was a three-masted craft, and was provided with an iron bulkhead abaft each mast. Like the Richard Cobden, she was without steam power. Her first voyage was from London to Bombay, Calcutta and Melbourne. She covered the distance between the two last named ports in 60 days. In June, 1854, she left Melbourne for home with a large and valuable cargo of wood and £300,000 in gold. The captain intended to round Cape Horn on this trip, but after passing Tasmania the ship sprang a leak during a gale, and as she listed with dangerous heaviness to port, the captain beat his way northward to Tahiti, and Papate was safely reached; but the vessel had only been kept afloat by three weeks' incessant pumping. At Papate the ship was pumped out and examined, and the leaks were found on both sides of the ship, abreast the mainmast. Three hundred rivets were knocked out and renewed before the vessel was again ready for sea. When the repairs had been satisfactorily completed, the captain again set sail, and this time safely reached London in March, 1855. The vessel was again overhauled, and the springing of the leaks was found to be due to the keelson, which, instead of being made solid from end to end, was constructed in three unconnected lengths separated at the fore, main and mizzen bulkheads respectively, and these bulkheads were found to be far too weak to withstand the enormous strains set up. The defects were remedied and the vessel made numerous voyages, principally between Philadelphia and New Orleans, and was finally stranded in the northwest Providence channel.

FOREIGNERS IN BRITISH SHIPS.

The report of the committee appointed by the British board of trade to inquire into certain questions affecting the mercantile marine has been issued. It may be of interest to refer to the remarks upon the increasing of employment of foreigners in British ships. There were 37,174 foreigners in 1901, an increase of 12,184 in thirteen years. The committee proposes no bar to their service so long as they can speak English, while regretting, as might be expected, that the number of British-born men is falling off. The members of the committee asked themselves: Is there any objection to be felt or apprehension entertained in view of the undoubted increase of foreign seamen in the mercantile marine? As regards the shipping trade, it appeared to the committee that there was no apprehension to be felt in time of peace. It is stated that "the trade is efficiently carried on, and there is no reason to suppose that the supply of foreign seamen available will run short. There appears to be no more real danger of scarcity of men in the event of a naval war. It is doubtful if even the subjects of the state with which we might be at war would desert their calling, and even so, the foreign seamen employed are of so many different nationalities that the supply would still be sufficient. It is worthy of notice that Swedes are the most numerous of all the foreign seamen employed on March 31, 1901, and that the Swedes, Norwegians and Danes together amounted to more than one-third of the total number of foreigners employed. It is probable also that some ships of the mercantile marine would necessarily be laid up in time of war, and their crews added to the number of men available for employment; and if freights and wages rose the effect would be to draw men from shore into sea employment." As to the naval service, this committee agrees with the one appointed last year on naval reserves, that in the event of any great naval war it would not be practicable to draw men to any considerable extent from the crews of the sea-going vessels of the mercantile marine.

MARYLAND STEEL CO. BUSY.

Sparrows Point, Md., July 8.—Five new vessels and five jobs for complete overhaul is the quota of the marine department of the Maryland Steel Co. in Atlantic coast ship building now under way. This yard may therefore be said to be the busiest on the coast. They secured a contract a few days ago for a large tug for the quartermaster's department of the army and they are the lowest bidders for the two large suction dredges to be used in New York harbor, for which the government opened bids last week.

The Norfolk-Hampton Roads Ship Building & Dry Dock Co., with a trifle of $20,000,000 of capital authorized, suffered its office furniture, valued at $800, to be sold at public auction last week to satisfy a debt. Meanwhile the plan to establish a plant at Hampton Roads has been definitely abandoned.

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DELAWARE RIVER SHIP BUILDING.

Philadelphia, July 8.—John W. Grange and Andrew H. McNeal, stockholders of the William Cramp & Sons Ship & Engine Building Co., failed in their efforts to prevent the consummation of the plan to raise additional working capital for the company. The injunction asked for by Grange and McNeal, to restrain the Cramp Co. from increasing its capital from $5,000,000 to $6,250,000 and its mortgage indebtedness from $1,800,000 to $7,500,000, was refused. As a result the company's recapitalization plan will be carried out and great good is expected from it. It is thought that with the orders on hand and with adequate working capital this large ship building company will have a prosperous future.

Work on the reconstruction of the steamship St. Louis, of the American Line, will be completed August 1 at the Cramp yard. She will then go to the large dry dock at Newport News. Work of repairing the boilers of the new battleship Maine, which will probably cost $10,000, is proceeding and preparations for the launching of several vessels on the ways are almost completed. Rainy weather has held back some of the out-door work of late.

The new harbor tug for use in New York, ordered by the Philadelphia & Reading road from the Neafie & Levy company, has been named the Wyomessing. The sea-going tug ordered last week by the same company for use at the port of Philadelphia will be named the Conestoga. Work at this yard is unusually brisk.

Arrangements have been completed at the works of the New York Ship Building Co., Camden, to launch the fire boat being constructed for New York city on August 11. When launched the boat will be complete in every respect with the exception of fire hose, nozzles and cabin equipment. As yet she has not been named. A number of New Yorkers, including fire department officials, will come over for the launch. The steel for the keel of the armored cruiser Washington arrived at the Camden yard last week and arrangements are now being perfected for the laying of this, the first keel of an armored cruiser to be built in the state of New Jersey. An elaborate program is being arranged and distinguisned visitors will be present from all parts of the United States. Mr. J. Fielden of the Atlantic Transport Co. was at the Camden works last week, arranging for the launching of the 625-ft. steamship Mongolian. It is said that a daughter of E. H. Harriman, the western railroad magnate, will perform the christening. August 1 is likely to be the date of the launching. The 625-ft. Manchuria for the Pacific Mail Line will be launched July 25 and the event is to be duly celebrated.

An official trial trip was given the steamer Harriet last week. The Harriet was launched May 26 at the Pusey & Jones Co.'s yard, Wilmington. She is a steel hull, towing and passenger steamer and was constructed for the Christiana Navigation Co. of Wilmington. A brief description of the Christiana follows: Length on deck, 70 ft.; beam, molded, 18 ft.; depth, molded, 7 ft. 4 in.; three watertight bulkheads; main deck of Oregon pine; engine of the fore-and-aft compound surface-condensing type; Scotch type boiler of 130 lbs. pressure. The Christiana, at her trial trip, easily fulfilled all requirements. Capt. Blocksson will command her and she will ply in river and harbor trade.

The passenger steamer Calvin B. Austin, built at Harlan & Hollingsworth's ship yards, Wilmington, was given her trial trip July 1, Capt. John Lockhart in charge. The contract speed of 18 miles an hour was exceeded, although the vessel was not pushed to her limit. After the trial she was turned over to her owners, the Eastern Steamship Co., and will run between Boston and St. John's. President David C. Reid of the Harlan & Hollingsworth Co., says that the appointment of a receiver for the United States Ship Building Co., of which his company is a part, will have no effect upon the plant. "Our concern will keep right on building boats," he says. The company is doing a large business and employs about 3,000 workmen. The passenger steamer C. W. Morse will be launched at the Harlan & Hollingsworth yards July 11. The Morse, which is being built for night service between New York and Albany, is the largest vessel ever constructed at these yards. She will be very fast.

Montclair and Orange are the names given the two tugs now building at the Dialogue ship yards, Camden, for the Delaware, Lackawanna & Western railroad. The tugs will be launched soon. They will be used in New York harbor.

The Maritime Exchange of Philadelphia has added a new and appreciated department, namely, the collection of data which will enable the shipping broker to see at a glance just what unchartered vessels are in port at any time of the day. Heretofore it has been necessary for the brokers to make the rounds of all local shipping offices to ascertain the desired information.

Searchlight experiments which the United States lighthouse service has been making on the lightships at Cape Hatteras have proven entirely successful and hereafter the searchlights will be a regular feature of the coastwise service. The searchlight warning of the danger of Diamond Shoals has fully demonstrated the practicability of the light and it will be continued. In addition to the usual lights there will be a searchlight throwing a vertical beam of white light towards the zenith.

During the discussion of the navy estimates in the house of commons last week Mr. Arnold Forster, secretary of the admiralty, announced that the admiralty did not intend to renew existing subsidies for merchant ships which may be used in time of war and that notice would be given on April 1 next that the contracts would terminate a year from that date. Many ships of the Morgan combine will be affected by this decision.

PROGRESS OF WORK AT FORE RIVER.

Quincy, Mass., July 8.—The Fore River Ship & Engine Co. still keeps ahead on the construction of the battleships of the New Jersey class building in its yard—the New Jersey and the Rhode Island. On June 1 these vessels were estimated by the United States naval constructor in charge to be 37 per cent. completed, which was a gain of 5 per cent. over their condition the first of May and which put them 5 per cent. ahead of any of the other vessels of the same class building in other yards, the Virginia being the nearest to them. Outwardly the Rhode Island is further advanced than the New Jersey, but the New Jersey's interior is the more complete and she is considered slightly in advance of her sister ship, on the whole. Both hulls are framed to the height of the main deck beams and placed amidships, and the greater part of the protective deck armor is in place. The Rhode Island's propeller shaft struts have been attached and the New Jersey's are ready. More than 2,000 men are now employed in the yard and the work in the ship tool shop and the forge goes on night and day.

Last Monday the two steel masts of the cruiser Des Moines were stepped by the gantry crane as the vessel lay alongside the Fore River fitting-out dock. The masts were made at the Charlestown navy yard and were sent to Fore River with the tops in place. The standing rigging will be put over the tops at once. The wooden top-masts, which are now alongside, on the pier, will be sent up later. The schooner-cut sails for the cruiser are now making at Charlestown and the rest of her canvas equipment is being prepared in the Rowe sail loft at Gloucester. On June 1 the Des Moines was 86 per cent. completed, standing third among the vessels of her class under construction. The engines will have their dock trial in a week or two and it is probable the cruiser will be ready to see deep water in a month.

Material for the four car floats building for the New York, New Haven & Hartford railroad at this yard is now all in hand and much of it is ready to be put in the hulls. The keels of two of them have already been laid, between the schooner William L. Douglas and the Fall River Line freight steamer, and as soon as the schooner's masts and bowsprit, which are being made ready on the beach, are out of the way the third barge will be started. The contract calls for completion of all four in six and eight months.

Keel plates of the passenger steamer for the Fall River Line have been laid on the blocks on the Fore River beach and the materials are on hand for carrying the hull along without delay. The freighter for this same line is building very rapidly. Forty pairs of bottom frames have been erected and the bulkheads are being set up.

Work on the six-masted steel schooner William L. Douglas is being rushed in order to get the vessel off the ways early next month. The masts and bowsprit, also of steel, are ready to step now, but will not be put in until after the launching. As soon as the Douglas is out of the way the blocks for the 16,000-ton battleship Vermont will be set in her place.

There have been a number of recent improvements in the mechanical departments of the Fore River ship yard. A new house for enameling pipe, etc., has been set up near the galvanizing shed, another large saw mill is being built near the lumber storehouse and the new brass foundry has begun operations. A system of blowers just installed in the pattern and joiner shops will convey sawdust, shavings and other litter directly from the machines to a furnace in the power house, almost a third of a mile of pipes of various sizes being used in its construction.

The spur track connecting the yard with the New Haven road accomplishes a considerable saving in getting freight to the plant and has developed sufficient traffic so that a freight shed is soon to be built at Braintree especially to accommodate the ship yard freight. Fore River's private rolling stock has been increased by another of the powerful little locomotives formerly used on the Manhattan elevated road in New York.

THE EUDORA CASE DECIDED.

New York, July 8.—Through Messrs. Hunter, Abbott & Coyne, proctors in admiralty, No. 29 Broadway, I learn that the supreme court has rendered a decision in the Eudora case favorable to the plaintiff, which was the crew of the vessel. This case grew out of the practice of "crimping," so far as foreign, especially British, vessels were concerned, the owners and masters of which held that the section of the United States seaman laws of 1898, relating to advances and allotments, did not apply to any but United States shipping. Hence it has been the practice of certain boarding bosses to carry on "crimping" by signing poor Jack with a British master for three months at one shilling a month, while the law allows the allotment of but one month's pay. In order to overcome this abuse the crew of the Eudora, backed by the Seaman's Union, brought the suit which has just been decided in their favor, and which will have a much wider application than as to this vessel and her crew, as there were several other similar cases awaiting the outcome. The decision holds that the law relating to advances and allotments applies equally to United States and foreign shipping, unless there be treaty conditions to the contrary. G. W. R.

While lying at Norton's coal dock, Menominee, during heavy weather last week, the steamer Ogemaw was struck by lightning. The crew was asleep at the time and all were thrown from their bunks, though none were seriously hurt.

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VERY HEAVY COAL MOVEMENT.

On July 1 the movement of freight of all kinds to and from Lake Superior, as reported by the canal officials at the Sault, was 458,433 tons (net) in excess of the movement on the same date a year ago and more than 5,000,000 tons in excess of the figures for the same date two years ago. Lake Superior ore shipments are not yet quite up to shipments at this time a year ago, but there is an immense gain in soft coal shipments. On July 1 of this year 2,368,855 tons of coal had been forwarded to Lake Superior ports, as against 1,594,859 tons to July 1 a year ago and 982,411 tons to July 1 two years ago. Sault traffic for June again exceeded all previous monthly records. The aggregate for the month was 5,105,078 tons of freight. Detailed summaries of the combined traffic of both canals, Canadian and United States follow:

Movement of Principal Items of Freight to and from Lake Superior.

ITEMS.	To July 1, 1903.	To July 1, 1902.	To July 1, 1901.
Coal, anthracite, net tons	307,863	103,167	196,823
Coal, bituminous, net tons	2,368,855	1,594,859	982,411
Iron ore, net tons	7,439,479	7,806,573	4,334,514
Wheat, bushels	21,062,994	24,398,148	9,381,344
Flour, barrels	2,242,766	2,625,705	1,877,341

Report of Freight and Passenger Traffic to and from Lake Superior, from Opening of Navigation to July 1 of Each Year for Three Years Past.

EAST BOUND.

ITEMS.	To July 1, 1903.	To July 1, 1902.	To July 1, 1901.
Copper, net tons	32,564	35,614	24,647
Grain, other than wheat, bushels	7,680,959	3,710,093	4,479,685
Building stone, net tons	1,690	17,231	10,494
Flour, barrels	2,242,766	2,625,705	1,877,161
Iron Ore, net tons	7,439,479	7,806,573	4,334,514
Iron, pig, net tons	1,130	7,396	10,953
Lumber, M. ft. B. M	293,917	329,625	247,772
Silver ore, net tons			
Wheat, bushels	21,062,994	24,398,148	9,381,344
Unclassified freight, net tons	25,853	22,325	9,388
Passengers, number	8,431	9,431	6,531

WEST BOUND.

Coal, anthracite, net tons	307,863	103,167	196,823
Coal, bituminous, net tons	2,368,855	1,594,859	982,411
Flour, barrels	30		180
Grain, bushels		60	36,330
Manufactured iron, net tons	42,812	42,454	28,959
Salt, barrels	145,287	174,274	172,751
Unclassified freight, net tons	161,708	190,796	139,515
Passengers, number	8,444	10,436	7,428

Summary of Total Freight Movement in Tons.

	To July 1, 1903.	To July 1, 1902.	To July 1, 1901.
East bound freight of all kinds, net tons	9,043,078	9,529,439	5,392,954
West bound freight of all kinds, net tons	2,901,856	1,957,062	1,374,166
Total freight, net tons	11,944,934	11,486,501	6,767,120

Total number of vessel passages to July 1, 1903, was 6,560 and the registered tonnage 9,581,801.

MR. ROBERT WALLACE RETIRES.

For some time past Mr. Robert Wallace, veteran ship builder of Cleveland, has talked of giving up active interest in affairs of the American Ship Building Co. Even as far back as the time of consolidation of the lake yards, Mr. Wallace was disposed to relinquish the responsibility of looking after the Lorain plant, which had been almost entirely of his making, but he was prevailed upon to take a salaried position with the combination and has since been generally in touch with all its affairs, and as highly regarded by President Brown and the other leading officials of the big company as he was by the working engineers of the lakes in the early days of the old Globe Works of Cleveland, in which his fortune as a ship builder was started. Mr. Wallace went to California three months ago on a vacation, and before starting he said he had concluded this time to retire in earnest. On his return, July 1, he announced that his services from the standpoint of responsibility were at an end; that he would no longer accept a salary, but would be thankful for desk room at the Cleveland office of the company, so that he might come and go as he pleased, attending to his private affairs. Mr. Wallace has been connected with lake interests steadily for fifty years. He sailed as an engineer for eight years and then became interested ashore in a couple of small machine shop enterprises that eventually resulted in the Globe Iron Works Co., the Cleveland Ship Building Co., and finally the American Ship Building Co., with its control of great ship yards in six or seven cities of the lakes.

SMOKE PREVENTION ON VESSELS.

During the past week vessel men in Cleveland have received a letter from John Krause, supervising engineer of the city, directing their attention to the smoke prevention ordinance and especially to section 3 of that measure. This section reads:

"That the owner or owners of any locomotive engine, steamboat, tug, dredge or pile driver, and the general manager, superintendent, yard master or other officer or employe of any railroad, steamboat or other company, having in charge or control the operation of any locomotive engine, steamboat, tug, dredge or pile driver, within the corporate limits aforesaid, who shall cause, permit or allow such dense black or gray smoke to be emitted from such engine within said corporate limits, shall be deemed guilty of creating a public nuisance, and of violating the provisions of this ordinance."

Mr. John Krause says that while it is not the policy to enforce the same in such a way as to work hardship to those who are operating steamboats, yet any unnecessary delay in complying with the requirements of the law will not be tolerated. He says that experiments recently conducted on several of the locomotives in the city and upon tugs operating in the river show conclusively that smoke preventing appliances can be installed with a comparatively slight expense which are efficient and satisfactory when proneriy handled. Every tug and vessel owner in Cleveland has received a copy of this letter, and as there is no evidence that the letter has been sent to anyone else it appears to be a natural conclusion that Mr. John Krause believes the vessel men to be the arch offenders in this particular. Vessels come into the harbor puffing and churning and belch forth vast volumes of smoke which utterly obscure the sun. For days together after a vessel has entered port nothing is to be seen of the source of light and its existence becomes merely a matter of hearsay. Such is the absurdity of official action. The real offenders are the factories scattered in all parts of the city and which make little or no pretence to prevent or consume smoke. The contribution of vessels to the general pall is not a thousandth part. Of course the prevention of smoke is a consummation devoutly to be wished. Dirt and soot have made Cleveland, naturally a beautiful city, an unlovely place. What was once a city set in a forest is now a succession of smoke-begrimed buildings sentineled by standing dead timber. Trees lose their leaf in July in the down town district, and in the immediate neighborhood of factories they do not leaf at all. All this is due to the fact that smoke closes the pores of the foliage. But in the general havoc the contribution of the vessel's smokestack is a very small one. Smoke unquestionably can be prevented but it would be unfair to vessel men to ask them to put expensive equipments under their boilers to be used during the few brief hours while the vessels are in port, and to leave factories, which operate twenty-four hours in the day, to go free.

MORE COAL AND GRAIN BUT LESS ORE.

Although it is certain that the movement of freight as a whole on the lakes is considerably larger (probably 1,000,000 tons) to July 1 than it was on the same date a year ago, iron ore shipments show a decrease to that date of 661,904 gross tons. The gain offsetting this ore shortage is mainly in soft coal shipments, which to Lake Superior alone show an increase of 773,996 tons, but there has also been quite an increase in grain shipments out of Chicago compared with last year. If it were not for the great delays to vessels at Lake Erie ore docks, there would, of course, be no decrease in ore shipments, but the causes of delay are persistent and it would not be at all surprising if a decrease in ore shipments is again noted for July. In the meantime the vessel interests are naturally pleased with a situation that shows less ore moving than last year with freights maintained. Ore shipments to July 1 aggregate 8,237,929 tons, compared with 8,899,833 tons to the same date a year ago, or a loss, as already noted, of 661,904 tons. The June shipments this year foot up 3,716,353 tons. In June last year the shipments were 3,751,696 tons, so that the loss for the month this year is 35,343 tons.

The Duluth & Iron Range shipping docks at Two Harbors have made a great record thus far this year in the ore trade. In June they put 863,990 tons of ore into 177 vessels, so that the average cargo was 4,881 tons. The average time of loading was 6 hours.

The United Engineering Works, San Francisco, has just closed a contract with the Alaska Packers' Association for a steel cargo and passenger steamer of the following dimensions: Length over all, 185 ft.; beam, 33 ft. 6 in.; draught, 12 ft. She is to be constructed to conform to Lloyds highest register.

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GOVERNMENT DREDGING ON THE LAKES.

Bids will be opened by Capt. J. C. Sanford, government engineer at Philadelphia, on July 18 for the construction of two additional dredges—one for service on Lake Michigan and the other for service on Lake Erie. One of them will be under the care of Maj. Dan. C. Kingman of Cleveland and the other under the care of Maj. J. G. Warren of Milwaukee. Both of them will be self-propelling suction dredges. Maj. Kingman of Cleveland says that it is a mistake to suppose, as many apparently do, that the United States government is about to go into the dredging business by the construction of these two dredges, and also of the two for New York harbor. He says that the federal government is the largest dredging concern in the business. It has at present between sixty-five and seventy dredges representing an initial investment of $2,000,000. The first appropriation for a government dredge was made in 1828, and was for service in North Carolina waters; the first government dredge was established on the lakes about twenty years later and many have been established since.

"I do not agree with the argument that the government is destroying individualism by building dredges," said Maj. Kingman. "The government is charged with the maintenance of channels and sheltered waters. They must keep the channels of a required depth for navigable purposes. It is to the interest of everyone that this work shall be done in the most expeditious and economical manner. Moreover, I don't think it is good reasoning to say that the government interferes with private enterprise by doing this work. In fact, by doing it quickly and well it vastly promotes private enterprise, for it makes possible arteries of trade which did not formerly exist. It widens the field of individual effort. On the lakes there is a certain amount of special dredging to be done which the government believes can be most economically done by a government dredge. For instance, there is a continual deposit being made at the mouths of rivers. It goes on all the time, and, of course, during the winter months uninterruptedly. In the spring there are always bars to be removed at the mouths of harbors. These bars can be most expeditiously removed by a suction dredge, which in passing over a territory takes off a few inches at a time. It would be impossible for the ordinary type of dredge to economically remove these bars, for in dipping down for a deposit it would, in order to obtain a lead, have to carry away more than was necessary. In maintaining a channel at a required depth there is nothing so economical as a suction dredge, and the one which we propose to construct will have seagoing qualities so that it will move readily from port to port. I am not making any experiments in this matter. My whole experience has taught me that the government's policy of directly dealing with this special work is the best. The cost-sheet, including the initial investment, maintenance, repairs and depreciation, works out to the credit of the government. My estimate, submitted to the war department, showed that for the work I had in mind during the next eight years $500,000 would be saved. This, of course, contemplates the constant use of the dredge. When I was employed on the Tennessee river I did work at 3 cents a cubic yard, which I am sure could not have been secured under contract for less than 25 cents. I believe that if the government with special facilities can do this special work better than a contractor it should do it. It should do it in the interest of the whole people, because it is public work, and therefore it is to the interest of the whole people that it should be economically done. It is not, strictly speaking, an encroachment upon private enterprise. The added demands of commerce consequent upon the proper maintenance of government channels will give private interests enough to do. There has been much opposition in China to the government construction of a railway because it will dispossess the trade of moving freight over hundreds of miles in wheelbarrows, an honorable calling pursued by thousands. But that is no argument. The government of China does not intend to compete in the wheelbarrow business. It is going to build a railway, and while it will undoubtedly extinguish the wheelbarrow as a long-distance carrier, it will not diminish one particle its legitimate employment of moving freight from car to truck. On the contrary, it will stimulate it by making it possible to move goods that cannot now be moved at all. Surely the government has the right to pursue in the manner which it deems wisest that which is peculiarly and especially its province—the maintenance o fadequate channels in its harbors. That one great avenue established adequately, private enterprise can find enough to do in developing its subsidiaries and auxiliaries. There ought to be no quarrel about this—the government means it for the greatest good of the community."

The foregoing argument sounds very well from Maj. Kingman's standpoint, and of course he voices the argument of the army engineer corps on this subject, but the fact remains that for every spoonful that is dredged by the government a spoonful less must be dredged by private enterprise. Plainly speaking, it is the opinion of everybody who is informed as to the relation which the engineer corps bears to river and harbor improvements of the country that the building of government dredges and other encroachments of this kind upon private enterprise are all directed (looking well into the future) towards the perpetuation of the army engineers in a line of work to which their right from the beginning has been questioned. The building of these dredges must again bring before congress—and in a more forcible way than it has been presented by the civil engineers—this matter of interference on the part of the army engineers with what rightfully belongs to reputable and efficient business interests. Why not go into the work of erecting public buildings and carrying out to the end all similar undertakings of the government? Of course a suction dredge is the right kind of dredge for the special work to which Maj. Kingman refers, but in all the great public works that have been carried out by contractors in time past under the direction of the engineers have not these same contractors been found ready to provide the necessary machinery and meet all reasonable requirements? Maj. Kingman's reference to the opposition in China to the construction of railways is unworthy of this discussion. The great river and harbor works that have been carried out under the contract system will suffice as an answer on that score. From all points of view it is, strictly speaking, an overstepping of the function of government to do dredging. There is no combination of lake dredgers which the government has to combat. There can be no monopoly in dredging; no excessive price can be charged, because as soon as a price becomes excessive competition is sure to be invited in this kind of work. Moreover, in any comparison of costs depreciation is an item which the government is prone to overlook. It is nothing to the government to discard an old dredge and build a new one without reference to cost. But the private dredger must subtract the cost of the dredge to reach his actual profit. So must the government add the cost of the dredge to reach the actual cost per cubic yard of surface dredged. That dredging is not especially lucrative is evident from the fact that not a single dredging interest on the great lakes has won a fortune from the business. It were better far that the whole of this work should be done by private contract under the watchful eye of the government engineer.

LAKE SUPERIOR LUMBER BUSINESS.

Duluth, Minn., July 8.—Lumber shipments from the head of Lake Superior for June were: Duluth, 45,160,000 ft.; Superior, 6,111,000 ft.; Two Harbors, 3,724,000 ft.; in all 54,995,000 ft. This is less than for any corresponding month in several years. It is 40 per cent. of all that went out of Lake Superior in the month. There are immense quantities of sawn lumber on dock and it must soon be moved in larger amounts than have been going out of late. Delay in sending this lumber east is due to a variety of causes, not least of which, no doubt, is the disposition on the part of dealers at lower lake ports to avoid expense by not taking the lumber until they find it absolutely necessary to do so.

In this connection it is interesting to note that one firm here, Alger, Smith & Co., is putting onto its docks at Duluth 700,000 ft. every day, as well as 450,000 lath and shingles. This is no less than 5,000,000 ft. weekly of lumber, which is a very large cut. This firm is employing 2,000 men in its operations here, at its mills, in camps and on its logging road, which is fifty miles long and is called the Duluth & Northern Minnesota. Ex-Secretary of War R. A. Alger is surviving senior partner of the firm and John Millen of this city is general manager. Mr. Millen is also manager for lumber interests of the same people at Grand Marais, Mich., where a daily cut of 300,000 ft. is made, and at Century, Fla., where they are cutting 250,000 ft. every day. All timber made at the Florida mill is exported, some to Canada but the bulk to Liverpool. The entire 1903 cut of the Grand Marais mill has just been sold for about $800,000. The mill at Grand Marais, by the way, was burned early in the spring and in fifty-five days another had been bought, razed, shipped from Chebogan, reerected and started up smoothly. This is believed to be record-breaking work.

Nearly every saw mill at the head of the lakes is running day and night, and the cut of the year will be about as large as last year. Two mills then in operation are now destroyed, one by fire and one by removal. Both were on the Superior side of the harbor, which now has but one saw mill, to Duluth's ten. There are also back of Duluth, on the Vermillion and Mesabi ranges, four mills whose product goes east by water, as well as several that do not ship this way. Part of the product of the five mills at Cloquet also comes to the city for water shipment east, though the chief trade of these interior mills is by rail to the west and southwest.

The lumber business of Ashland, long a very important Lake Superior shipping port, will diminish this year about 40,000,000 ft., and this is the last year of large cutting there. In 1904 it is estimated that Ashland's product will not be 50 per cent. of what it was in 1902, showing how close to its end is the saw mill industry of northern Wisconsin. Even now Ashland mills are fed to a very considerable extent by timber towed across Lake Superior from points on the north shore from 50 to 70 miles northeast of Duluth.

In a very few years the saw mill industry of Duluth will begin to show signs of similar effacement, but the decline will not be so rapid nor so complete as at Ashland. There is timber in the hands of several of the larger Duluth firms to maintain their mills at full speed for from five to fifteen years, and there is an immense district to the north that has not yet been entered. Part of this the Duluth, Virginia & Rainy Lake road is now reaching, and on the line of this road its own projectors control 2,000,000,000 ft. of standing white and Norway pine. Much of this will come to this city for sawing. Aside from this single ownership it is reasonable to suppose that others control a very considerable amount. But this district is the last of the white pine fields of the near northwest, and when it is cut there will be little more white pine east of the slopes of the Rockies.

A four-masted wooden schooner, the Elizabeth T. Day, was launched from John M. Brooks' ship yard at Harbor View, Mass., last Saturday. She is 161 ft. long, 37 ft. wide and 18 ft. deep.

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WHALEBACK TO CARRY BULK OIL.

Steel barge No. 101, historically important because she was the first of the McDougall whalebacks on the lakes, has been sold by the Tonawanda Iron & Steel Co. to the Barrett Manufacturing Co. to be converted into a bulk oil and tar vessel and has started on her journey to the Atlantic coast, where the necessary changes will be made. Matteson & Drake, naval architects and marine engineers of Philadelphia, represented the Barrett Manufacturing Co. in negotiating the sale, and will prepare the plans for conversion and look after inspection of the work, having made a specialty of bulk oil carriers. A portion of the present hold will be sub-divided into five tanks, formed by steel transverse bulkheads, with a pump room located aft of the after cargo tank. Aft of this a cofferdam will be built, in order to have a body of water between the oil cargo and the boiler room, which will be located aft of the cofferdam. A hoisting engine will be provided for handling the anchor gear and mooring lines, and the vessel will be put in the very best possible shape.

The 101 was built in 1888, but being constructed of steel and sailing in fresh water during her whole career, is in better shape than many boats of more recent construction. Although the whaleback barge is in disfavor for freight service on the great lakes, it has many excellent features for bulk oil, and should prove quite successful.

GOSSIP ABOUT LAKE WATER LEVELS COMMISSION.

A dispatch from Montreal regarding the international lake water levels commission is of interest in that it seems to be written with some authority:

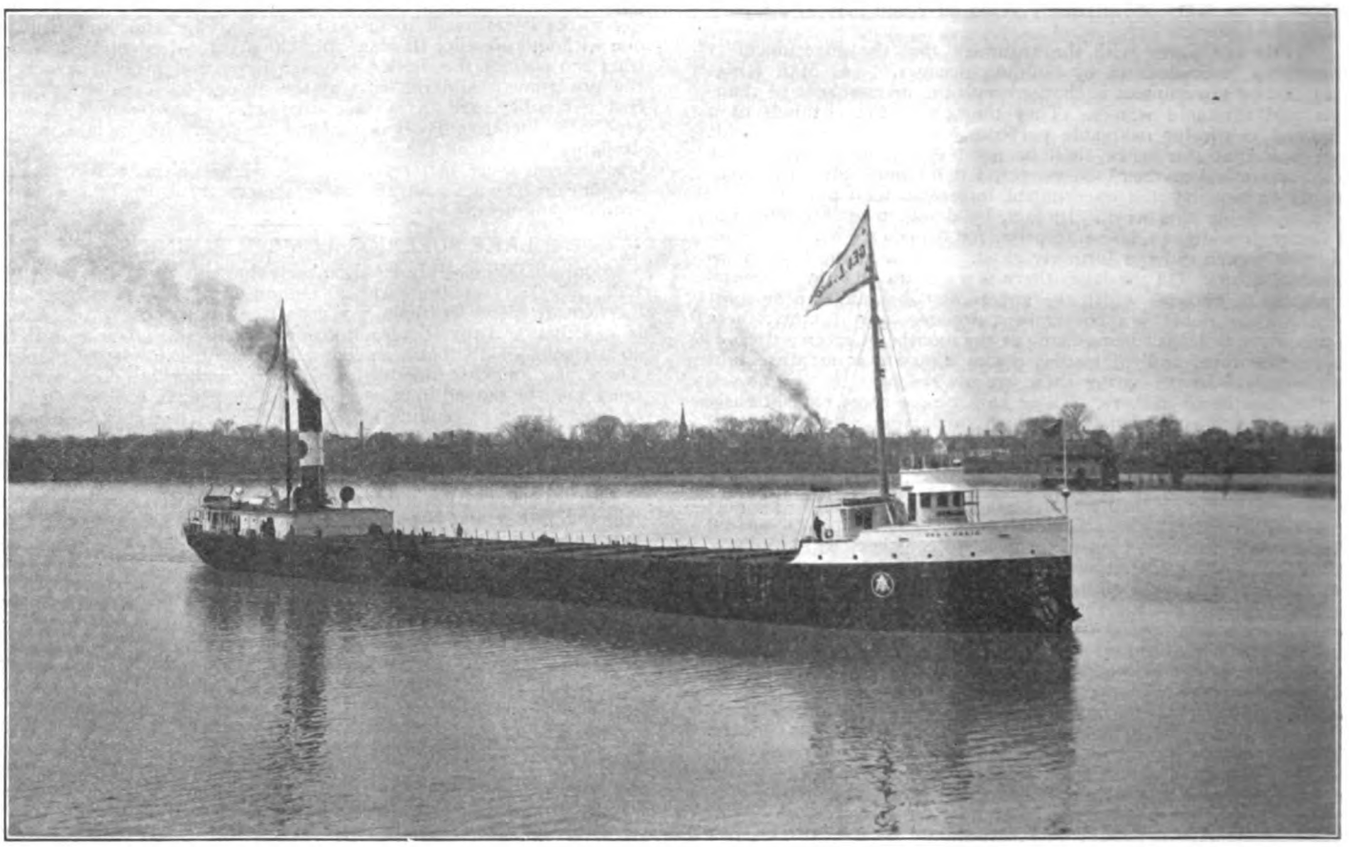
"It is believed here that both Canada and the United States will shortly make the long pending appointments of members of this commission, which is to take up the question of the effect upon lake levels of the numerous proposed channel improvement schemes, of the diversion of water into the Chicago drainage canal, and for power purposes, and the probable damage to riparian interests resulting from raising lake levels by means of regulating works at Buffalo, as recommended by a former American commission. It is said that two of the three Canadian commissioners will be John Kennedy of Montreal, who has been connected with the harbor work at this port and is a marine engineer of high standing, and Thomas Monro of Coteau Landing, who built the Soulange canal. The third member will undoubtedly be a lawyer of eminence connected intimately with the party in power. It is believed here that two of the American commissioners will be Col. O. H. Ernst of Chicago, representing the United States engineering corps, and George Y. Wisner of Detroit, of the former commission. The third member, the attorney in the case, will probably be Harvey D. Goulder of Cleveland, attorney of the Lake Carriers' Association."

NEW LOAN FOR CONSOLIDATED LAKE SUPERIOR.

Negotiations are pending between the Consolidated Lake Superior Co. and the banking firm of Speyer & Co. in regard to the renewal of the $5,200,000 loan made by the bankers to the big industrial company at the Sault. The negotiations involve the further question whether the bankers shall advance the company additional working capital to the amount of $2,000,000, which, it is declared by persons in authority, the company needs to develop its earning power effectively. An interest identified with the company said it was compelled to secure additional funds and was seeking to get them from Speyer & Co., under the same mortgage which secures the $5,200,000 loan. The latter fell due July 1 and has not been paid, but this is not regarded as serious, because the company has not been expecting to meet this obligation promptly. For some time, it is said, the bankers and the management of the company have been practically agreed upon what terms the loan should be renewed. The interest referred to said:

"The situation is just this: The company needs money and needs a lot of it. Its principal property, the steel mill, is just about ready to begin operations, but it takes about three months before one lot of material can be run through from the beginning and made up into the finished product. In addition, we will be obliged to stock up with iron ore, coke and a great variety of other things sufficiently to keep us going during the season in which navigation on the lakes is closed from about Nov. 1 to April 1. You see it is simply working capital that is needed. Not a dollar is required on the plants themselves. Once the steel mill is turning out rails, we will be overloaded with orders. In all of its recent concessions the Canadian government has stipulated that railroad materials shall, as far as possible, be of Canadian production. As to steel rails, that means in effect that all orders shall be placed with us. As for the pulp mills, power plants and the other works, they are running smoothly. The only difficulty the company has experienced arises from the great amount of working capital needed. But as $30,000,000 has already been invested in the company, what more we must have will be forthcoming."

No formal action has yet been taken in regard to the renewal of the loan and Speyer & Co. has not yet signified whether the firm will furnish the additional capital needed. It is understood the absence of James Speyer in Europe has somewhat delayed the progress of negotiations. The directors desire to postpone the making of a permanent loan until the steel mill has demonstrated its earning power, as they believe that they can then obtain money on better terms than at present. Meanwhile the temporary loan must be renewed and, the directors believe, more money furnished to prevent a serious check to development. The bankers are believed to favor the settlement of the entire dilemma with a permanent loan. A representative of the company says the damage which caused the closing of the power canal and the power plant on the Michigan side of the St. Mary's river has



The steamer George L. Craig, built by the Craig Ship Building Co., Toledo.

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been repaired without difficulty and will not seriously interfere with or diminish the earnings of the company.

The Consolidated Lake Superior Co. is a holding company for corporations operating a great diversity of enterprises in the Sault region of Canada and Michigan, including a railroad, a fleet of lake steamers, blast furnaces, iron and nickel mines, saw mills, water and power plants, interurban railways and pulp mills. The holding company has $27,000,000 of preferred and $72,000,000 of common stock outstanding. It was organized in 1897 and until Sept. 15, 1902, paid 7 per cent. dividends on the preferred stock. In December last the company experienced severe financial straits and negotiated a loan of $3,500,000, and later another of $1,200,000. The stocks of the company slumped on the Philadelphia market in a sensational manner and for a time the future of the concern and the millions invested in it were dubious. The most substantial banking interests came to the rescue and re-established a high degree of confidence in the company.

CHICAGO GRAIN FREIGHTS.

Chicago, July 8.—Grain freights show little change from last advices. The market at times is very narrow, but rates hold reasonably firm on the basis of 1⅜ cents for wheat, 1¼ cents for corn and 1 cent for oats to Lake Erie. Rates to Pt. Huron and Georgian Bay are the same as to Buffalo. The Lake Ontario demand is dull at 2¾ cents bid and 3 cents asked on Kingston corn. P. H. Fleming & Co., vessel agents, furnish your correspondent with the statistics as to shipments and stocks that are forwarded each week. Shipments are noted as follows:

	Week just closed.	Last week.	Week last year.
Wheat, bu.	211,520	593,948	320,207
Corn, bu.	1,464,035	2,549,288	555,036
Oats, bu.	715,624	1,538,012	840,127
Total	2,391,179	4,681,248	1,715,370
	Shipments since Jan. 1, 1903.		Same time last year.
Wheat, bu.	10,536,830		14,256,207
Corn, bu.	39,570,138		17,280,275
Oats, bu.	33,517,046		27,687,716
	83,624,014		59,224,198

Stocks in elevators again show some gain. The figures on this score follow:

	Week just closed.	Last week.	Last year.
Wheat, bu.	4,276,000	4,485,000	3,158,000
Corn, bu.	7,340,000	6,096,000	5,677,000
Oats, bu.	1,765,000	1,291,000	404,000
Rye, bu.	203,000	262,000	118,000
	13,584,000	12,134,000	9,357,000

GREAT PRODUCT OF ONE ORE COMPANY.

Mr. John Birkenbine, a celebrated iron ore authority, wrote the following letter to the Lake Superior Iron Co. upon the occasion of its recent semi-centennial celebration at Ishpeming:

"It would certainly be a gratification if it were possible for me to participate in the celebration to which you have invited me, and I would be interested in the presentation of data, which I am sure will be made, on the progress in iron ore mining, which means the advance of the iron and steel industry from one of relative insignificance, in 1853, to a controlling influence on the industries of the country in 1903. The effect which the opening of the Lake Superior mines had upon the development of the upper peninsula extends into the transportation system of the great lakes, and as the initial movement of a business which has become enormous, it may properly be celebrated with spirit and eclat. The exploitation of the Ishpeming deposits extended until the Marquette range became the important mining center of the country, then followed in turn developments upon the Menominee, Gogebic, Vermillion and Mesabi ranges, and Canada now also contributes to the iron ore supply.

"In spite of the large outputs from local mines, and the enormous contributions from the other ranges, it is gratifying to note that the Marquette range, as the initial development maintains its prominence, and that the mines of the Lake Superior Iron Co. continue among the important operations of the country, with an aggregate product of over 11,000,000 tons, the range having contributed to date over 70,000,000 tons of iron ore. The product of the iron ore mines in the Lake Superior region, which last year was more than 27,500,000 gross tons, could not have been appreciated as a possibility fifty years ago, and although other ranges have been opened, some of which have outstripped the Marquette range in annual tonnage, the facts that the oldest range has supplied more ore than any other, and that in 1902 it reached its maximum output, are certainly indications of the wealth which has been developed as the result of the initial enterprise in 1853. Similarly, the abnormal development of some of the deposits in the other ranges, which have exceeded in annual quantity the production of the Lake Superior Iron Co., cannot lessen the appreciation of their importance, for the deposits which your company control have exceeded 11,000,000 tons in the aggregate, a quantity which is approached only by three other mining enterprises in the Lake Superior region; being as much ore as was produced by the entire region in any one year until 1897, and their annual output is so well maintained as to rank among the leading producers of the country. But it is not only the quantity but the quality of the ore which has come from the mines of the Lake Superior Iron Co. which emphasizes the far-reaching influence which they have had upon the manufacturing supremacy of the United States. If it were possible to collect data as to the money distributed by reason of the exploitation of these mines in the last fifty years, the figures would be startling, for they would include not only wages at mine, but those paid for construction of equipment, building of railways, locomotives, cars, vessels, shipping and receiving docks, blast furnaces, rolling mills, etc. Who of us can measure what the production of over 11,000,000 tons of excellent iron ore has meant to this country?"

AROUND THE GREAT LAKES.

Capt. Gregory Francis, well known throughout the great lakes, died at his home in Bay City a few days ago, aged seventy-six years.

Capt. James Millen of Detroit, at one time president of the Lake Carriers' Association, suffered a stroke of paralysis a few days ago.

Rear Admiral George C. Remey, chairman of the lighthouse board, is making a tour of the great lakes. He will begin his trip on the government boat Haze.

Thomas Gawn, for many years identified with the lake trade, died at his home in Lorain this week. He disposed of his vessel interests some years ago. He amassed a fortune through his holdings in Lorain real estate.

An examination will be held at the office of the engineer of the tenth lighthouse district in Buffalo on Friday, July 31, for the purpose of establishing an eligible list of carpenters. Applications must be made before that date.

Capt. Henry Stone of Cleveland leaves the steamer Leonard of the United States Steamship Co.'s fleet to take command of the steamer Wilbert Smith of the same fleet, launched recently at the Lorain works of the American Ship Building Co.

Jeremiah C. Collins, assistant boiler inspector for the Milwaukee district, died of heart disease last week. He was fifty-nine years old. Engineer Collins saw many years' service on Lake Michigan steamers. Three of his sons are engineers on the lakes.

The Great Lakes Towing Co. has offered a reward of $200 to anyone who can locate the wreck of the tug O. W. Cheney, which was run down off Buffalo by the steamer Chemung two weeks ago. While the company's tugs have dragged the vicinity several times no trace of the wreck has been found.

Coal trimmers have settled their troubles with the Pittsburg Coal Co. at Ashtabula in regard to the installation of the new coal trimming machine, and have returned to work. The trimmer will be abandoned for the remainder of the season. Next season, however, it will be installed on all the coal docks and hand trimmers will be dispensed with.

The International Salt Co. has decided to remove from South Chicago to Chicago. An immense wharf is to be built on the south branch of the Chicago river. The new wharf will be 800 ft. long and 250 ft. deep and will be built by the Chicago & Great Lakes Dredge & Dock Co. Sheds will be built upon it with a storage capacity of 300,000 tons of salt.

Whether released or not the Gilchrist steamer Craig, which went ashore a couple of weeks ago in the Straits of Mackinaw, will prove a total loss from an insurance standpoint. A rock, which has broken through the vessel's bottom forward, is 15 by 8 ft. and runs 1 ft. up into the vessel. With fair weather the wreckers hoped to have a bulkhead built within the vessel by the end of the present week.

It is reported from Detroit that a conference between President Livingstone of the Lake Carriers' Association and President Penje of the Seamen's Union has resulted in an agreement to the effect that if men are scarce on the lakes in the closing months of the season the union will provide help for vessels of the Lake Carriers' Association in preference to vessels that are not members of that organization.

Messrs. Todd & Schumacher, inspectors of steam vessels at Buffalo, hold the pilots of both vessels responsible for the collision of the steamer Chemung and tug Cheney off Windmill point on the night of June 23. Three lives were lost and the tug was sent to the bottom. The inspectors suspended the license of Pilot James Ward of the Chemung for six months. The pilot of the Cheney went down with his boat.

Two steel steamers that were to have been launched a couple of weeks ago at the Superior yard of the American Ship Building Co.—the H. G. Dalton and the D. M. Clemson—did not go into the water until Friday last. The Dalton is for the Great Lakes & St. Lawrence River Transportation Co. and is of the Welland canal size. The Clemson is a big carrier built for the Provident Steamship Co. She is 408 feet long.

Harbor Master Peter Lynch of Cleveland has made an arrangement with the managers of ore docks and the local tug manager whereby vessels loaded with ore will be held within the breakwater enclosure outside the harbor when there is a jam of ore carriers awaiting turns at the docks in that part of the harbor known as the old river bed. The arrangement is such, it is claimed, that no vessel will lose her turn at the dock.

Mr. Arendt Angstrom, manager of the new Canadian Ship Building Co., Toronto, had a narrow escape from drowning last Sunday evening at Shanty bay. He took his two little girls out rowing and in some manner his rowboat upset about 300 yards from the shore. He seized one child in each hand and by treading water managed to keep them afloat until a boat put out from shore

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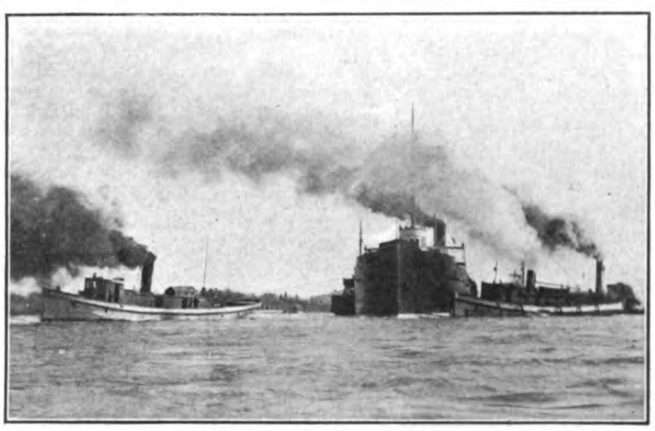
and rescued them. Fortunately the accident occurred while those on shore were watching and no time was lost in putting a boat out.

Last April Capt. John Dorrington of Detroit purchased the steamer A. L. Hopkins from Norman D. Carpenter, the consideration being $13,000. According to his bill of complaint now filed in court, Dorrington claims he paid Carpenter $5,000 in cash and the balance in two notes of $4,000 each, secured by a mortgage on the steamer. Dorrington says he purchased the steamer on the representation that she was in first-class condition. When she was brought to Detroit, Dorrington claims he found her boiler to be out of repair and the steamer in unseaworthy condition. Carpenter refused to return the money. Judge Brooke issued a temporary injunction restraining defendant from disposing of the notes and mortgage. Plaintiff asks that the $5,000 be returned to him, with interest from April 8; that the contract be declared void, and that the court award him adequate damages.

June has been a record breaker in Tonawanda for lumber shipments and receipts. The receipts of lumber amounted to 70,882,800 ft. This is not only the largest month's receipts this season, but it also exceeds the receipts for any month of last year. Last month's receipts exceeded those of the preceding month by nearly 10,000,000 ft. and those of June, 1902, by over 32,000,000 ft. Since the first vessel arrived in April, 137,297,200 ft. of lumber has been brought down the lakes to the Tonawanda ports. During the same months last year but 104,641,890 ft. arrived. This gives the current season a lead of nearly 33,000,000 ft. According to those conversant with the situation, 1903 is certain to continue in the lead to the end, very little of the new cut contracted for last winter having yet begun to move forward. Of last month's receipts, North Tonawanda got 54,236,800 ft. and the balance, 16,646,000 ft., was unloaded in Tonawanda harbor.

AGROUND AT THE CROSSING.



A large lake package freighter, the Mauch Chunk, aground at the Lime-Kilns, with the Wales, Saginaw, Home Rule and Columbia all at work on her.

A curious accident befel one of the dredges of the Chicago & Great Lakes Dredge & Dock Co. while working on the Chicago river last week. With its great weight, increased by lifting its huge 6-yd. dipper full of clay from the river's bottom, the planking on the bottom of the hull of the dredge was not strong enough to withstand the pressure from a submerged spile on which it had rested and the latter wore a hole through the dredge's bottom. The accident occurred while the crew was at its noon-day meal. When the alarm was sounded no time was lost in calling assistance. The fireboat Illinois, two tugs from the Great Lakes Towing Co. and four from the dredging company, responded quickly to the call. Upon arrival of the fleet the smaller boats were placed around the dredge and made fast, to prevent its sinking. A powerful siphon was inserted into the hold and by vigorous pumping from the fireboat the inrush of water was kept in check until a diver could plug up the hole. Three hours were required in performing the operation.

At a meeting of the board of managers of the Lumber Carriers' Association, held in Detroit this week, the Great Lakes Towing Co. submitted a proposition which will grant concessions to lumber tonnage in towing charges, provided the members of the association give all their business to that company. The lumber boats will also be put on a more equitable basis with other tonnage. Instead of 20 per cent. off tariff rates the lumber carriers will under the new agreement get 30 per cent. off, except at Chicago and Tonawanda, where they will get 35 per cent. off tariff rates. The cash discount will be 10 per cent. instead of 5 for other tonnage. When towing vessels in the lake from port to port the tug company will make no charge for the tow in at the destination, but the regular rate out of harbor will be charged at the starting point. Owners of lumber tonnage who have already made contracts will have the option of changing to the new form, and they are also offered from one to five-year contracts. The lumber carriers' committee has recommended that the members accept the new contract.

NAVAL BOILER QUESTION IN FRANCE.*

Relative Merits of Large and Small-size Tubes for Boilers of Cruisers and Battleships.

During the past ten years there has been waged beneath the protective decks of the warships of all navies a spirited battle of the boilers. As naval efficiency is involved in the outcome of the result, the contest has caused engineering experts to give special study to the problem of finding for their respective navies an approved type of water-tube boiler that would be light in weight, economical in space as well as in coal consumption, capable of severe forcing, and possessing an endurance surpassing that of the Scotch design. In all navies there have been installed in warships, for experimental and other purposes, water-tube boilers that not only gave trouble shortly after the time they were put to use, but which have been proved to be absolutely unsuitable for the severe and unusual conditions to which warship boilers must be occasionally subjected. And thus the question of the water-tube boiler in every naval service is one that is far from being satisfactory to engineering experts. There can be no return to the Scotch boiler, and therefore naval experts must strive to improve the water-tube design rather than attempt to dispense with such type.

From time to time of late the statement is made that the modern water-tube boiler is as heavy as the Scotch design. The weakness of this statement rests in the fact that water-tube boilers carrying 240 lbs. pressure are compared with cylindrical boilers carrying 160 lbs. Thoughtful engineers are, however, asking the question, "Why use 240 lbs. steam pressure? Is not 200 lbs. a sufficiently high limit?" It is certain that if the same pressures were carried in the Scotch type that are carried in cylindrical types, the shells would have to be made so thick and the plates would be so severely strained in flanging and working that constant trouble would be experienced with the cylindrical design. The rapidity of getting up steam in the water-tube boilers, and the ability of replacing them without disturbing the protective deck, constitutes a military advantage that will make it impossible to return to the Scotch design. By a process of elimination, approved types of water-tube boilers are now being selected, which will undoubtedly possess the essential requisites demanded for naval purposes. As England has the largest navy, and did much pioneer work in the boiler line for others, her story of surprise and disappointment was the first to be heard. About four years ago her naval administrators awoke to the fact that this battle of the boilers promised to impair her naval prestige, if not her maritime strength. As a result of this apprehension, a boiler commission was appointed, and the several *ad-interim* reports submitted by this commission have attracted so much attention and caused so much study to be given to the question that many of her naval experts now believe that the boiler problem has become the naval problem of the hour. Events have occurred of late that seem to foretell that it will not be long before we ourselves will have the problem to solve of what to do with some naval vessels installed with boilers that are possibly too tender for service needs.

In France, likewise, the boiler question has been the subject of special and studious consideration. The following circular letter, addressed to the vice-admirals, commanders-in-chief, the marine prefects and directors of private ship building establishments, clearly shows that the admiralty officials fully realize that the question is one which vitally concerns the efficiency of the navy. The communication is an exceedingly important one, and it will cause increased attention to be given to the question of finding one or several types of boiler suitable for various naval purposes. As the boiler problem will be specially considered from several standpoints in this year's volume of the Journal, the communication of the French minister of marine should form an important part of the projected symposium upon the question. While publishing in its entirety this communication of M. Camille Pelletan, attention is called to the fact that the minister of marine of France has been misinformed as regards the statement that no small tubes have been used in the boilers of the American warships of large size. Two of our battleships have been fitted with small curved-tube boilers of the semi-vertical, submerged-tube type. As both of these ships will be in commission within a year, the navy department will secure some very positive information as to whether or not such ships can be run for protracted periods without the boilers becoming impaired, or decreasing in efficiency. The contract requirements of all our battleships also specify that a full-power trial of four hours' duration shall be conducted, and that the air pressure carried shall not exceed one inch. The speed demanded by contract requirements is so high that forced draft must be used on all boilers during that trial. While the specifications do not permit over an inch of water pressure to be carried in the fire rooms of very large ships, it is exceedingly doubtful if it would be ever possible for any contractor to secure a greater pressure, even though he was permitted to do so. With the closed-fire-room system, there must of necessity be so many air leaks, especially through the bunkers, and in the boiler fronts and casings, that it would be practically impossible to secure higher pressure in all the fire rooms at the same time. This certainly applies to warships of over 6,000 tons displacement. Space has never yet been alloted for the installation of blowers of sufficient size to secure more than one inch of air pressure in all the fire rooms of a battleship or armored cruiser, and thus our boilers on official speed trials, with one inch air pressure, are practically subjected to the severest conditions pos-

*From the Journal of the American Society of Naval Engineers.

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sible. If, however, only a portion of the boilers are used and all the blowers kept in operation, a greater pressure than one inch can undoubtedly be secured in one or a number of the fire rooms. It can also be expected that every navy will demand that the approved type of boiler for future use shall in an emergency be capable under forced-draft conditions of burning, for at least six continuous hours, more than 30.9 lbs. of coal per hour per square foot of grate.

The official order of the French minister of marine, which is dated at Paris Feb. 12, 1903, and signed by M. Camille Pelletan, is as follows:

"This order, relating to the selection of boilers for large warships and to the trials to which they should be subjected, is herewith brought to the attention of the board of admiralty:

"The choice of the best type of boiler suitable for war vessels has occupied the attention of all naval powers for years. The demands for an ever-increasing speed has made this question not one alone for safety and economy, but, more important still, one of preponderating military importance. I find, however, that there exist in France at this date differences of opinion and of practice upon questions which appear to have been finally settled in other countries. For a long time, small-tube boilers have, for good reasons, been considered a necessity for torpedo craft. By means of such installations the speeds hitherto attained have been realized on very small displacements. As in many branches of industry France has had the honor of having taken the initiative, it has been so as regards small-size tubes for boilers of certain classes of vessels. The temptation to extend the advantage derived from the installation of boilers of the small-tube type by introducing them into ships of great displacement, is readily understood. But there is an apprehension upon the part of a number of competent judges that their introduction into some of our recently-constructed cruisers has hardly been justified by the results secured. The fact that there is apprehension on this subject is incontrovertible.

"The small-tube boilers have two drawbacks, other things being the same. Their grate surface is so limited that in order to obtain results comparable with boilers of large tubes strong forced draft is necessary. This entails extra and severe work on the fire-room complement. Those firing the small-tube type of boiler are thus obliged to handle in the same time and within the same space double the weight of combustible ordinarily consumed with steam generators fitted with larger tubes. Hence there also arises a very rapid clogging of grate bars, due to the accumulation of ashes and clinkers, thus entailing additional labor upon an already overworked force. The result of such firing must be accompanied by a corresponding loss in efficiency.

"The gravity of these defects is not realized to its full extent when the small-size tubes are installed in boats that are designed to make comparatively short runs, and that are not expected to operate far from their base. In view of the exceptional speed desired of torpedo boats and destroyers, boats in which the installation of small tubes is effected, the loss in efficiency must receive but comparatively little consideration, particularly as speed is not only the chief end of the design, but is the principal safeguard of this type of craft. It ought to be practicable, however, to improve these exceptional adverse conditions as regards the coal consumption in torpedo boats by carefully selecting a specially-prepared fuel. The rapid clogging of the grate and the low efficiency of the boilers of torpedo boats might thus be guarded against. The case is far different when we regard ships destined to make long voyages with such fuel as may be obtained at the several coaling ports that are visited by our ships of war. It should be borne in mind that the small tubes are more exposed than the large ones to deteriorating agencies; that it is almost impossible to inspect them, and that the difficulty of finding leaky tubes makes such design of boiler difficult to repair.

"On official trials, when the boilers are new, where the coal is picked, where the trial is of short duration, and a special crew of experts is secured, this class of boiler shows quite satisfactory results. But as soon as the small-tube boilers are used under conditions approximating those of actual cruising service, the delusion that they are suited for vessels of large tonnage vanishes. The coal expenditure then increases 50 per cent. above that used on trial. The steaming radius of action of the ship correspondingly shrinks. Since the naval complement in the fire room is always much smaller than that detailed for the trial trip, it becomes difficult, not to say impossible, to obtain the same degree of forcing of the boilers, and thus secure the horse power desired. When this type of boiler is subjected to extended service the heating surface becomes less efficient, and many of the advantages which are found under trial-trip conditions disappear.

"Such appears to have been the concensus of opinion of other naval powers. Not one amongst the most powerful maritime nations has been tempted to follow our example. Neither England, the United States, Russia nor Italy places small-tube boilers on their ships, except upon craft similar in tonnage to our torpedo boats. If Germany has employed them in her ironclads, she has done so in conjunction with a type of boiler most widely divergent in design, namely, the cylindrical boiler of the merchant marine. Where this combination of cylindrical and water-tube boilers has been installed, it is designed that the cylindrical type shall be used for ordinary cruising, while the water-tube steam generators are held in reserve, to be used only when the maximum speed is desired. Even this highly ingenious combination of widely divergent types of boiler does not appear to have been as successful as was anticipated. It is true that in some other countries, notably Holland, Sweden and Norway, small-tube boilers have been installed on ships of considerable size, but never on vessels exceeding a displacement of 5,000 to 6,000 tons.

"We are, then, absolutely the only one power which has attempted to drive ships from 8,000 to 12,000 tons displacement with boilers of this description. It is not because boilers of the small-tube type are not well known and advertised abroad. The manufacturers of small-tube boilers have never succeeded in getting them adopted for ships of great displacement. It is particularly interesting to read that the English admiralty, long interested in the importance of the question of the choice of boilers, has constituted a commission of experts to report on the value and the proper use of the boilers of all types. This boiler commission, after study of all phases of the controversy, has made a preliminary report, wherein it is recommended that small-tube boilers should not be used on warships larger than cruisers of the third class. With us a different course has been pursued, even in the face of the adverse report and protest of the 'Council des Travaux.'

"The hope was indulged in that our action would be one of progress, and would place us in the lead of other nations. This hope has been frustrated. The disparity between results obtained on trial and those secured in actual service have in too many cases justified the apprehension that exists. I have taken special care to consult with representatives of the corps best qualified to give advice upon the question—the corps that is charged with the operation of the boilers. As these officers are in continual contact with such boilers, they have excellent opportunity to note their good qualities and their faults. The opinion of the committee of our engineers conforms with the views of engineers in foreign navies, namely, that small-tube boilers should not be used on ships of great displacement.

"In consequence of the consultation referred to, I have decided to install on our new armored cruisers only boilers of the types recommended to me as suitable by the committee of naval engineers. The third recommendation of this committee has appeared to me no less important and worthy of adoption. Upon this suggestion are based the instructions relating to the boiler trials of ships of our navy. In the first place it is proposed to establish for the trials of our ships moderate rates of combustion, somewhat similar to those which can be demanded and expected under normal cruising conditions; that is to say, a combustion of from 100 to 110 kilograms per square meter of grate surface (about 22.54 lbs. per square foot). It is manifestly a species of self-deceit to base the engine power on a performance with forced draft. Such condition is only obtainable with extraordinary exertion on the part of the personnel, with machinery new or recently overhauled and for a period extending over but a short space of time. It is also well known that the boiler efficiency decreases as the rate of combustion increases.

"The system to be adopted, therefore, involves economy in fuel, so that either the radius of action for the same coal supply will be extended or a saving of weight will be realized with the radius of action remaining the same. Is it, then, the intention to do away with forced draft entirely? Not at all. Instead of considering forced-draft conditions as the normal ones, it is proposed to regard forced draft as a reserve power which may be invoked in time of need. It is necessary in effect always to consider that part of the boilers may not be in condition for use, either because they are in need of cleaning or have suffered injury in battle or met with accident. In a case where the expected work of a ship had been calculated only upon forced-draft conditions any injury to the boilers would seriously interfere with the results anticipated. According to the plan which I have adopted, the power desired could still be developed with only three-quarters of the boilers subjected to high forced draft. This would necessitate, however, a coal consumption of 150 kilograms per meter of grate surface (30.74 lbs. per square foot). Such test will in future constitute the condition for the second trial to which the boilers of our ships will be subjected.

"The duration of these two trials should also be increased. The natural-draft trials have been for some years rather too short in duration in our navy, and were still further shortened after the introduction of small-tube boilers. The length of a trial should be such as to furnish an indication of what the tested boilers would do under conditions approximating those of actual cruising, and should not be adjusted to suit the frailties of the particular boiler experimented upon. Large vessels designed for continuous cruising must have a trial exceeding three or four hours' duration if the adequacy of the boiler is to be demonstrated. Under normal conditions of coal consumption a duration from eight to twelve hours should be fixed for the test. A trial of the duration now demanded will suffice for the test when three-quarters of the boiler power is under forced draft. In this matter of the duration of trials, I am only extending to France methods of practice recognized as necessary and reasonable elsewhere. All naval powers of the world conduct natural-draft trials of their ships, and the length of such trials is from eight to twenty-four hours. They all agree in making their forced-draft trials of shorter duration than ours, using only a part of the boilers during such test.

"There exists, therefore, solid reasons for the belief that the foregoing regulations are founded on a just regard for the needs of a war fleet. We do not build costly war vessels to obtain trial results more or less brilliant. It is our purpose to create ships which in service and in time of battle will realize their country's hopes and expectations. In order to obtain such a result we should as nearly as possible make the trial conditions approximate to those which the ship is destined to meet in fulfilling its high mission of constituting its country's defense."

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SEEN AND HEARD ON THE LOOKOUT.

It has been told that upon the white cliffs at Dover, England, a huge cannon used to be mounted, from the muzzle of which depended a signboard with the inscription:

"Sponge me well and keep me clean,
And I'll carry a ball to Calais green."

For the benefit of those who have not seen Calais it may be mentioned that Calais in this instance is simply called green because it happens to rhyme with clean, but, whether clean or green, the distance from it to Dover is twenty-one miles, and the two cities are separated by the Straits of Dover, one of the most crowded waterways at all times of the year. On French charts the Straits of Dover are named *"le pas de Calais,"* which Voltaire changed into *"le pas du sericux au ridicule,"* or the step from the ridiculous to the sublime. Whatever of truth there may be in the cannon's boastful assertion that it can deliver a ball in Calais, it is of more importance to find that human beings can now take the step Voltaire mentioned in fifty-five minutes by taking passage on the new steamer Queen, which recently took her place in the regular service between Dover and Calais, and which is designated to make the journey between London and Paris quicker and easier than it has been in the past. The Queen is equipped with turbine engines, and though her cost is $400,000, or about the same as a vessel of similar size furnished with reciprocating engines, her owners confidently expect that the yearly expense bill for repairs of engines will be insignificant as compared with the amount they used to pay when the former type of machinery was used. It appears that the advantages of the turbine over the reciprocating engine are many. Such engines require less space; they are at the bottom of the vessel and in height only 6 ft. to the top, while other engines stand 20 ft. on their bedplates; and last, but not least, the turbine causes little or no vibration, something which is conducive to preserving the temper of the passenger and the longevity of the boat. Nothing being altogether faultless, a few of the turbine's disadvantages may be heard of later. Mr. Parsons, the inventor, declared that there would be no mechanical difficulty in applying the turbine to large ocean steamers, and that the best ocean record might be broken by a vessel thus equipped. And a short while ago it was predicted that the limit, not only of size but of speed, had been reached! Let us cancel our orders for flying machines.

On steamers and sailing vessels, no matter what flag they fly, it is the custom to strike bells every half hour to record the time of day or night. A Portuguese captain once explained the reason for striking two bells at 1 o'clock, six bells at 3 o'clock, etc., and I would gladly quote him in Portuguese were it not for the fear that it might embarrass your readers—as it certainly would me. In the days before ships' clocks were invented (for obvious reasons those with pendulums used on land were not practicable on shipboard) all vessels were provided with a so-called hour-glass, although the time required for the contents of the upper globe to be transferred into the lower one was half an hour. After the captain had taken a noonday observation the watch on deck was relieved and a boy placed in the cabin to take charge of the hour-glass and warn those on deck each time it needed to be reversed, which, of course, is only another manner of saying to make known as soon as a half hour had elapsed. At the termination of the boy's four-hour watch at 4 o'clock, eight reversals of the glass having been made known by striking eight bells, the next boy began to count one for half past 4 o'clock and so "ad infinitum." This same Portuguese master upon being asked why on deep-water sailing ships the man coming to relieve the helmsman must invariably walk along the lee side or what causes the port side of a ship to be considered more plebeian than the starboard, as evidenced from the fact that gangways on yachts and men of war are always on the starboard side, and sailors of the latter, when having occasion to go aft, are instructed to walk to port if possible, was unable to give a decided answer, but promised to furnish the desired information upon his return to America, and after he had consulted a friend in Lisbon, of whom he spoke as a person who "knew it all."

A great deal has been said about the traps that are prepared ashore to catch the guileless sailor. The gentry known as "crimps" are still up and doing, but their prey is more wary than of old. As an illustration of how on one occasion it was the sailor who laughed last, herewith is given a truthful account of the meeting, not to forget the parting, of Mike and Frenchy. Frenchy was a sailor, and a good one as regards seamanship, who, staggering under the load of a bulky bag, to which he referred as his "dunnage," in the city of Quebec, met Mike, a boarding-house keeper, who offered him bed and board, even after being told that his prospective guest was not supplied with money. Navigation on the St. Lawrence being closed during the winter months, and it then being late in the fall, Mike's offer of hospitality convinced Frenchy that at least one vessel was expected to be in need of men when coming down from Montreal, and his "dunnage" was given into Mike's care. After sojourning two days under Mike's roof, Frenchy was awakened one morning at an unearthly hour with the information that a ship was coming down that needed a man. Incidentally it may be explained that if placed on board in Quebec, the substitute for a sailor deserting in Montreal ships, generally by the "run," or receives a previously stipulated sum for going to the ship's place of discharge, irrespective of the length of time required to reach there. With Frenchy in the bow, Mike in the stern and two French Canadians at the oars, the party soon reached midstream to wait for a large ship that was being towed down. Deftly catching a rope thrown from the deck, Frenchy quickly followed his bag, while Mike, whose obesity prevented his successfully substituting a half-inch manila rope for a companion ladder, towed alongside in company with two boatmen who anxiously awaited the order to cast off as each delay increased the distance they would have to row to reach home. While the captain was informing Frenchy that he would receive $40 for the run to Glasgow, some unprintable assertions from the rowboat reminded his former guest that Mike was still on deck, paradoxical as that may sound. Frenchy then told the skipper about his obligations—two days' board and boat hire. Telling Frenchy to go forward, the captain, tucking a $5 bill between the strands of a heaving line, lowered it within reach of the boat's occupants, but Mike loudly proclaimed that half the run money, or $20, was the least he could accept; whereupon the captain withdrew his novel pocketbook and its contents. As stated before, Frenchy was a good sailor, and as such knew that it was not considered shipshape to have ropes hanging over the side of a vessel towing to sea. On his way forward, as ordered, he cut a rope that stretched over the rail and which he was unable to haul on board because a boat containing three men was tied to the end of it. A translation of Frenchy's muttered comment in his native tongue as he went on the forecastlehead to get an introduction to the mate was: "Two days' board in Quebec; one excursion in a rowboat on the St. Lawrence, $40 in Glasgow—let her blow." F. H.

OUR NEED OF SHIPS.

Editor Marine Review:—In the two years, 1900-1901, Denmark, with only 2,500,000 population, did a foreign trade of $247,000,000 each year, and the money paid stayed in Danish pockets. That is what it means to have ships enough of your own to do your own business. In the years 1897-1899 the figures averaged $213,000,000; 1900-1901 were each $50,000,000 more than in 1897.

In 1861 there were 2,642,628 tons of shipping under the American flag under register engaged in the foreign trade. It was never so great in any other year. In 1902 American tonnage under register had declined to 882,555 tons, one-third the tonnage of 1861. In 1861 American ships carried 65.2 per cent. of the country's foreign commerce, and in 1902 the proportion under the American flag had fallen to 8.8 per cent. The value of our foreign commerce in 1861 was $584,005,000, and in 1902 it was valued at $2,104,840,301. American ships carried foreign commerce valued at $381,516,788 in 1861, and the value carried in 1902 was only $185,819,087.

"A nation may be able to fight, trade and organize, and yet, if unable to expand and spread, will not endure. Holland turned the tide of wealth from Spain to Amsterdam and ruined her mighty foe, but failed to expand. After a period of great power the Dutch dropped out of the race, and lost their place among the leading nations."—Senator Lodge.

"Of the carrying trade going to China in 1898 we carried three-fourths of 1 per cent. Yet we call ourselves a commercial nation and are ambitious to be a maritime nation. The entire wheat crop of the northwest last year might have gone to the Pacific coast, if there had been ships to take it when it got there."—James J. Hill.

In 1901 we shipped $266,000,000 worth of American agricultural products to Great Britain, but 92 per cent. of it was carried in foreign vessels.

"The imports amount to nearly $1,000,000. As nine-tenths of the civilized people are Americans by birth or descent, United States goods and wares are preferred to any others, but no United States steamer or trading vessel touches at Liberia. Holland, with a direct line of steamers and with commercial agents here, ranks first in commercial matters. Germany leads England in trade. Two steamers from Hamburg call at Liberia per week."—United States Minister Crossland of Liberia.

"We favor every encouragement possible to our merchant marine in the extension of American commerce in American ships on every sea."—Ohio Republican state convention.

"We have not outstripped England on the seas; we do not even now make a show of existence, and cannot do so unless this government awakens to the fact that if American shipping and ship building is to prosper it must be fostered by some system of subvention or assistance. American ship builders have been ruinously handicapped for years."—Charles H. Cramp.

Great Britain began the policy of subsidizing steamships in 1839. Three steamships had an annual compensation of $267,300, with Samuel Cunard. This was soon increased to £81,000, or $393,000, annually for four steamships or nearly $100,000 for each steamer. From 1839 until now Great Britain has voted annually sums ranging from $2,500,000 to $6,000,000 for its faster and larger ships.

Senator S. B. Elkins of West Virginia, who is now in Europe, says he intends to reintroduce next session a bill reducing by 10 per cent. the duties on goods taken to the United States in American ships, or increasing by 10 per cent. the duties on goods taken in foreign ships. He expects the measure will have strong support. WALTER J. BALLARD.

Schenectady, N. Y., July 8, 1903.

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IN CLIPPER-SHIP DAYS.

According to the San Francisco Chronicle, California is responsible for America's pre-eminence in international yacht racing. The discovery of gold put a premium upon record-breaking sailing ships for the run from Atlantic seaports "around the horn." Eastern ship yards began striving for great sailing speed. The creation of the splendid California clipper ship was the result. They were a novelty in ocean racers that commanded the admiration of the maritime world and won for their skippers the reputation of being the most skillful and daring sailing masters in the world.

What was learned and evolved by the construction of the famous California clipper ships practically established on the Atlantic seaboard of the United States a school of world experts in the art of designing and building ships of wonderfully swift sailing ability. The ingenuity and skill of the builders, combined with the unrivaled seamanship of the Yankee skippers, placed Americans in the lead as sailing racers of the sea. These clipper ships were built to carry all the spread of sail possible, and their captains became noted for the way they would drive their vessels, never reefing a yard of canvas night or day except in a heavy gale, while old-style ships would be plowing along timidly with more than half their sails furled. The clipper ships decade from 1850 to 1860 marked the height of America's maritime supremacy. From about 1835 to 1850 the reliable old Blackball liners sailed back and forth across the Atlantic as passenger and freight carriers. They were comfortable, but clumsy ships, each peculiarly marked with a big black circle upon the foretopsail. But the introduction of steamships steadily forced these slower vessels out of business. Then came the next epoch of sailing vessels, the Baltimore clipper type, built for greater speed, and seen on the Atlantic from about 1840 to 1850. Meanwhile the success of steam was creating a demand for faster sailing to meet the new competition, and the extra clippers developed, beginning in 1843 with the 750-ton Rainbow, and reaching a climax in 1855 in the completion of the clipper ship Great Republic, a vessel of 4,550 tons, with a length of 325 feet. These sea racers suddenly became a commercial necessity after the rush of gold hunters to California, for it was a matter of big profits to the ship that could land her merchandise first at San Francisco without the expense and uncertainty of breaking cargo and moving it across the Isthmus of Panama for reshipment in another steamer, already overcrowded with gold-seekers and their personal baggage. So it happened that the extreme clippers came to be called California clippers, and they outsailed everything on the seas from 1850 onward for twenty years. Then, as a modification of these swift sailers, came the half clippers—ships with less mountainous canvas and greater carrying capacity. Their epoch was about the decade 1860 to 1870. Most of the splendid California clipper ships, having performed their original function by hurrying merchandise to San Francisco in the exciting times of the '50s, were sold to foreigners or remodeled to carry less canvas and a smaller crew.

When the demand for the fast California clippers was at its height along about 1850 every ship yard on the Atlantic coast with the necessary facilities was engaged in building clipper ships. The principal clipper ship yards were McKay's, near Boston, and Webbs, at New York. From the McKay yards were launched in quick succession the Staghound of 1,550 tons, the Flying Fish of 1,600 tons, the Bald Eagle of 1,600 tons, the Flying Cloud of 1,700 tons, the Westward Ho of 1,700 tons, the Empress of the Seas of 2,250 tons, and the Sovereign of the Seas of 2,400 tons, and then a little later the amazingly big Great Republic, a mammoth clipper ship of 4,550 tons, a leviathan among sail craft as large as the Great Eastern was among steamers. But the Great Republic never made the trip to California. Her upper deck was burned off before she started, and she was repaired and slightly modified and sold to France for a transport, to be used in the Crimean war, in which service it was said of her "no steamer could catch her when she had a whole-sail, leading wind." A good many of the clipper ships were bought by England and France in the hasty effort to secure adequate and fast transports to hurry troops to the Crimean war.

How really fast the California clipper ships were, those vessels ranging from 1,600 to 4,500 tons, may be better understood when it is stated that at that time a vessel of 1,000 tons was a wonder for size. The California clippers, built primarily for the California trade, found their way all over the world, and on all seas, aroused astonishment, not only for their lofty masts and unprecedented spread of canvas, but for their matchless speed and remarkable gracefulness.

How very large the California clipper ships were may be seen in the following authentic performances, which stand and will stand as world's sailing records, for there will never again be sailing ships like those splendid California clippers. Steam has forever relegated them to oblivion.

1851—Flying Cloud; New York to San Francisco, 13,610 miles; 89 days; sailed 374 miles in one day.

1853—Flying Dutchman; New York to San Francisco and return; discharged and loaded, wharf to wharf, 27,220 miles; 6 months, 21 days. San Francisco to the equator, 2,380 miles, 11 days, 9 hours; rounded Cape Horn, 6,380 miles, 35 days.

1853—Trade Wind; San Francisco to New York; 13,610 miles; 75 days.

1854—Flying Cloud; New York to San Francisco, 13,610 miles; 89 days, 9 hours.

1854—Comet; Liverpool to Hong Kong, 13,040 miles; 84 days.

1855—Mary Whiteridge; Baltimore to Liverpool, 3,400 miles; 13 days, 7 hours.

1857—Flying Dutchman; San Francisco to New York, off Staten Island; 80 days.

1859—Dreadnaught; Sandy Hook to Liverpool, 3,000 miles; 13 days, 8 hours.

1860—Andrew Jackson; New York to San Francisco, 13,610 miles; 90 days, 12 hours.

1870—Young America; San Francisco to lightship off Sandy Hook, loaded, 13,580 miles; 80 days, 20 hours.

1872—Young America; Liverpool to San Francisco, 13,800 miles; 96 days.

FUTURE OF STEEL TRADE.

In the course of an editorial review of the past and the probable future of the steel trade the London Iron & Coal Trades Review remarks that very few industries can show the same remarkable expansion. An industry that has been so progressive in the past is hardly likely to stagnate in the immediate future.

"So far as the output of steel is concerned," says the London publication, "the United States led the world in 1902, as in many previous years, only more so. The total output of Bessemer and open-hearth steel in that country during 1902 was practically 15,000,000 tons. This figure cannot adequately be appreciated, except by the appreciation of the fact that the total volume of steel produced throughout the world was not, in 1894, more than 12,851,000 tons, or fully 2,000,000 less than the output of steel in the United States alone in 1902. Probably the total steel output of the world in 1902 will have been 35,000,000 tons, the five leading countries having unitedly produced rather over 32,000,000 tons. In other words, the world's output of steel today is fully eight times that of only twenty-two years ago, the output of 1880 having been only a trifle over 4,000,000 tons." What is to be said as to the future? asks our contemporary. "We have seen that during the last twenty years the age of steel may be said to have been created, or, in other words, the output of today is three times or more what it was in 1894. This progress may be maintained, or it may not. The general impression is that it will. The recent rate of growth may not be kept up. There must be, as there have been, ebbs and flows. But it is possible to conceive of an increase during the next twenty years equal to that of the past, and, not only so, but some recent writers even speak of such development as if it were a sure thing. If so, we shall in 1923 be producing from 20,000,000 to 25,000,000 more tons of steel than we are turning out today. What country is to furnish this vast increase? The current belief is, of course, that it must be mainly supplied by the United States. This is, at least, very probable. But the United States is now depleting its best iron ores at the rate of over 30,000,000 tons a year, which at the present rate of exhaustion means in twenty years fully 500,000,000 tons of existing ore resources. It is not improbable that when this event happens the United Kingdom may resume its primacy to a much larger extent than even the most optimistic can now anticipate."

NEW DEPARTMENT OF COMMERCE AND LABOR.

A pleasant ceremony in the office of Secretary Cortelyou of the new department of commerce and labor attended the transfer in Washington on Thursday last of the several bureaus, most of them having to do with shipping, that are to be included in the new department. The chiefs of all the bureaus, the control of which passed to the new department, gathered in the secretary's office, and in addition there were a number of distinguished people present, including Secretary Moody of the navy department. Secretary Cortelyou made a brief address concerning the objects and aims of the department and there were several responses. In addition to the bureaus of corporations and manufactures created by the new law the department of commerce embraces control of the following: The census bureau, formerly under control of the interior department; the lighthouse establishment, steamboat inspection service, bureau of navigation, United States shipping commissioners, national bureau of standards, coast and geodetic survey, bureau of immigration and bureau of statistics from the treasury department; the bureau of labor, fish commission and the bureau of foreign commerce, the latter being transferred from the state department.

NEW SYSTEM OF OFFICIAL NUMBERS.

A new system of official numbers for American vessels went into effect on July 1, when the bureau of navigation joined the department of commerce and labor. The new series of numbers begins at 200,000, and hereafter new vessels will be numbered seriatim in the order of application for official number, regardless of the initial letter of the vessel's name, and of rig or motive power. Thus the official number will indicate approximately the date of build of each new vessel hereafter, being permanently marked on its main beam.

In a telegram which reached the state department last week H. G. Squiers, United States minister at Havana, reported that the coaling station treaty and the treaty defining the status of the Isle of Pines had been signed. The coaling station treaty provides for the lease to the United States for the purpose of erecting naval stations tracts of land at Guantanamo, on the southeast coast, and Behia Honda on the northwest coast. The other treaty clears up the doubtful political status of the Isle of Pines by the provision that it shall be under Cuban sovereignty.

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HAS ONE OF THE ELASTIC WINDLASSES.

The Elizabeth T. Doyle, a four-masted wooden schooner of 1,000 gross tons, built for Atlantic coasting trade and now about ready to leave the ship yard of John M. Brooks at Harbor View, East Boston, is equipped with the most modern type of windlass and capstan made by the American Ship Windlass Co. of Providence, R. I. The vessel is herself largely owned in Providence. The windlass is of the new elastic kind and is thus spoken of by the Providence Sunday Journal:

"Between the wildcat and the locking head is interposed a spring head which has four pockets in it for holding four large springs. The wildcat has also four similar pockets, which oppose those in the spring head. There are also four springs in the bevel gear which drives the capstan. The capstan is provided with a ratchet and holding pawls so that any strain coming on one of the chains is cushioned by four springs in the wildcat and four in the bevel gear, thus preventing the parting of the chain under a sudden strain. Schooners as a rule are provided with a messenger chain arrangement for driving the windlass from the hoisting engine. This messenger chain often stretches and breaks, thus disabling the windlass. The windlass on the Elizabeth T. Doyle is entirely different, being provided with an independent pair of engines, which are fastened to the under side of the forecastle deck and drive the windlass by worm gear, which is fastened to an upright on the capstan shaft. By this arrangement two speeds can be obtained, both by steam and by hand."

FIFTY MILLIONS IN IRON AND STEEL IMPORTS.

Iron and steel imports will show a total of more than $50,000,000 in the fiscal year ended with the month just closed. The bureau of statistics figures show for eleven months an importation of $47,000,000 worth of iron and steel manufactures, against $23,000,000 worth in the corresponding months of 1902, and $16,000,000 worth in the same months of 1901. This is in marked contrast with conditions in recent years. The total importation of iron and steel manufactures in 1898 was $12,250,000; in 1899, $12,000,000; in 1900, $20,000,000; in 1902, $27,000,000, and in 1903, as already indicated, $50,000,000.

The high water mark of iron and steel imports is closely associated with periods of prosperity and business activity. An examination of the bureau of statistics tables of iron and steel imports shows that the imports of iron and steel made high records in the years 1891, 1882 and 1873. In 1870 the importations were only $32,000,000. From that point they gradually increased until 1873, when they were $59,000,000; then they dropped to $9,000,000 in 1877, 1878 and 1879; then suddenly increased again to $53,000,000 in 1880 and to $67,000,000 in 1882; then again moved downward to $33,000,000 in 1885; then mounted again to $53,000,000 in 1891, and from that time steadily decreased until they reached $12,000,000 in 1898 and 1899, only to once more move upward, until in 1903 they will again pass the $50,000,000 line.

While importations of iron and steel are chiefly classed as "manufactures," it should be understood that they are almost exclusively of the "partially manufactured" class, in the form of pig iron, ingots, blooms, slabs, billets, bars, etc., to be used as working material by the manufacturers of the United States. The importation of pig iron shows a remarkable increase, the total value of pig iron imported in the eleven months of 1903 being over $15,000,000, against less than $3,000,000 in the corresponding months of last year and a trifle above $1,000,000 in the same months of 1901.

The following table shows the principal articles of iron and steel manufactures imported into the United States in the eleven months ending with May, 1903, compared with the figures of the eleven months ending with May, 1901:

	Eleven months ending May 1901.	Eleven months ending May 1903.
Total iron and steel	$16,408,996	$47,012,535
Pig iron	$ 1,187,606	$15,344,114
Ingots, blooms, billets, etc.	1,171,077	9,035,800
Machinery	3,142,568	3,700,146
Tin plates, terne plates, etc.	3,535,313	2,955,656
Railway bars	43,152	2,645,358
Scrap iron for remanufacture	311,005	1,752,522
Bar iron	925,611	1,659,538
Cutlery	1,458,908	1,611,097
Wire rods	986,778	1,047,074
Firearms	823,143	628,891
Wire and articles made from	442,093	591,710
Sheets and plates	229,174	437,384
Needles	349,120	402,503
Shotgun barrels	240,078	213,389
Hoop, band or scroll iron	14,485	86,000

Directors of the United States Steel Corporation on Tuesday declared the regular quarterly dividends of 1 per cent. on common stock and 1¼ per cent. on preferred stock. They also issued a statement showing the net earnings for the quarter ended June 30 to be $36,499,528, as compared with $37,662,058 for the same period last year, a decrease of $1,162,530. Net earnings for the half-year aggregate $61,568,235, as against $64,377,515 last year. Deducting amounts set aside for sinking funds on bonds, depreciation and reserve funds reduces the net earnings for the six months of this year to $54,182,936. After payments of dividends there is an undivided profit or surplus for the six months of $17,037,047. The company has unfilled orders on hand amounting to 4,666,578 tons. Last year this time these orders aggregated 4,741,993 tons.

BELLEVILLE WATER-TUBE BOILERS

NOW IN USE (FEBRUARY, 1903)

On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

French Navy	276,460 H. P.
English Royal Navy	849,300 "
Russian Imperial Navy	193,900 "
Japanese Imperial Navy	122,700 "
Austrian Imperial Navy	32,900 "
Italian Royal Navy	13,500 "
Chilian Navy	26,500 "
Argentine Navy	13,000 "
The "Messageries Maritimes" Company	87,600 "
Chemins de fer de l'Ouest: (The French Western Railway Co.) Steamships plying between Dieppe and Newhaven	18,500 "
Total Horse Power of Boilers in Use	1,634,360

WORKS: Ateliers et Chantiers de l'Ermitage, at Saint-Denis (Seine), France.

TELEGRAPHIC ADDRESS: Belleville, Saint-Denis-Sur-Seine.

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UNITED STATES SHIP BUILDING CO.

Receiver James Smith, Jr., lost no time in assuming charge of the affairs of the United States Ship Building Co. He filed his bond of $100,000 immediately upon his appointment and went to the general offices of the company. "I found it necessary," said he, "to take immediate steps to prevent demoralization and consequent loss. My desire is to conserve the interest of the bondholders and keep this great business intact and to place it at the earliest possible moment upon a sound financial basis. No interruption of the uniform progress of the work is contemplated, as not only would the United States government but the great maritime interests be injuriously affected by anything that would delay the work of the plants."

No action has been taken by the directors upon Mr. Lewis Nixon's resignation.

John F. Allen, 370-372 Gerard avenue, New York city, reports May shipments of Allen riveters as follows: Canadian Ship Building Co., Toronto, one machine; American Car & Foundry Co., Berwick, Pa., two; W. H. Peabody & Co. (for Paris), two; Manitowoc Steam Boiler Works, Manitowoc, Wis., one; Cleveland Crane & Car Co., Wickliffe, O., one; Virginia Bridge & Iron Co., Roanoke, Va., two; American Paving & Contracting Co., Philadelphia, one; Lauer & Harper Co., Baltimore, one; Fletcher & Crowell, Portland, Me., one; Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., one; Westinghouse Electric & Mnfg. Co., Pittsburg, one. These orders embrace only complete machines shipped.

The Signal & Control Co., of which Mr. W. H. Roberts is secretary and general manager, manufacturers of electric automatic whistle operators, formerly located at 24 West street, has removed to more commodious quarters at 161 Washington street, New York City. Their whistle operating device is in use on several vessels, some of them being on the great lakes, and is pronounced by those using it as a great success. It does away with the necessity of an attendant looking after the blowing of the whistle at intervals during fogs or snow storms, and does the work better than it can be done by hand.

Sunday party rates via Nickel Plate road.—Persons desiring to avail themselves of the very low rate afforded for parties of five or more traveling on same train from any station on the Nickel Plate road to any other station on that road within 100 miles from starting point and return same day, are hereby notified that they are required to procure such tickets before the arrival at starting point of the train on which they desire to travel. Agents are not permitted to sell these excursion tickets within five minutes of the time advertised for the departure of the train for which they are sold. 114, July 24.

The Blue Book of American Shipping

is a marine directory and is the only one published in the United States.

It contains a correct list of names and addresses of ship builders, engine and boiler builders, vessel owners, steamship lines, repair yards, dry docks, dredging companies, marine engineers, captains of vessels and all persons identified with shipping and its allied trades.

If you are a manufacturer or dealer in products consumed by any of these, the Blue Book is the very book you want.

It will be to your advantage to subscribe to the Blue Book in advance of its publication for this reason: A classified directory of marine manufactures and supplies is compiled from among its advertisers and subscribers and this list is consulted constantly by ship builders and ship owners. Your name will be entered under suitable headings according to your products.

It is the biggest Five Dollars worth of advertising to be had anywhere.

The 1903 edition of the Blue Book is now in course of preparation, therefore promptitude is a necessity if you desire your name to be inserted in the classified directory.

The price of the Blue Book is $5.00 and it is delivered free of carriage.

MARINE REVIEW PUBLISHING CO.,
39-41 Wade Building,
Cleveland, Ohio.

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ORIGINATOR OF THE IRONCLAD.

According to the New Orleans Picayune, the man who originated the idea of the ironclad was Capt. J. J. Peetz of Algiers, who held the rank of first lieutenant in Grivot's artillery during the civil war. Capt. Peetz drew the plans and superintended the construction of the iron armor of the Manassas, the ram which played such havoc with the federal war vessels in the lower Mississippi. She was a twin-screw propeller towboat called the Enoch Train and was originally brought out from Boston by the firm of Hyde & Mackie. The confederate government took possession of her and began reconstructing her for war purposes. Said Capt. Peetz:

"After Lincoln's election it was generally accepted that there would be war, and having had experience in seafaring and the construction of vessels in the Crimean war on board the English line-of-battle-ship Orion, of ninety-nine guns, I began the study of a vessel that would be effective and dangerous to an enemy. While stationed on this English battleship, blockading Cronstadt on the Baltic, the small Russian gunboats frequently sallied out, and, having guns of longer range, could lie where our guns could not reach them, and place shots clear through our wooden vessels. I often wondered if this could not be prevented if something was there to make the balls glance off, or if our vessel set lower in the water with a covered, inclined top, instead of having a high freeboard or height out of the water.

"The Crimean war came to an end. I gave up the study until the approach of the war of the states. I was in Mobile at the time, and after much thought I made a model and tried to awaken interest in it among the people of that city, but William L. Yancy, the great secessionist, came to Mobile and made a number of speeches, claiming that we did not need any ships. He said that cotton was king, and that England would have to have cotton and would open our ports to get it. His views were sadly mistaken, as it afterward proved. After a few months, when the need of ships was apparent, the building of two of them was started in Mobile. They were the Morgan and the Gaines, both planned on the old style. I submitted my model for inspection, but getting no encouragement, came over to Algiers. I was personally acquainted with John Hughes, the dry dock owner, and showed him my model. He immediately became interested in it, and seeing its utility soon got the confederate government to adopt it as the plan for the ram Manassas. The boat turned into the ram was reconstructed by putting on an extra bow made solid and extending out a few feet, with an iron prow for ramming purposes. A shield, or roof, was put over the deck in the shape of a turtle back. The frames were 8 in. thick, molding way; that is, solid against each other crossways from forward to aft, and the planking on top of this was 4 in. thick. Outside of this she was covered with a single layer of flat street car iron, such as was used at that time to run the street cars on, not rails such as are used now. On the water line all around she had a solid sponson 4 ft. thick to protect her from being rammed. She carried two 68-pounders, one over the stem and the other over the stern-post. She had a projecting stem below the waterline, extending out 2 ft., for the purpose of ramming. When the ram was all ready, Capt. Alexander Frazer Warley, a graduate of Annapolis, was placed in command, and I was taken on board as quartermaster.

"We left the city for Fort Jackson and remained there eight days, and then went down the river to within a few miles of the enemy's fleet, then lying in southwest pass. Being very low in the water, with a short smokestack, we were hidden from their view by the high marsh grass, but by raising our Jacob's ladder we could plainly observe their movements. We lay there several days, waiting for a dark night so as to take them by surprise. We left our moorings one night between 11 and 12 o'clock and started toward them, going at half speed. Being low-pressure, the boat made no noise and we came to within 30 or 40 ft. of the first vessel of the enemy's ships. I was at the wheel and orders were given to port the helm, which I immediately complied with, thus bringing us in line to ram the vessel ahead. We struck her a glancing blow on the port bow and raked a portion of her sheet metal off, but did not injure her enough to sink her, as was intended. We backed out to prepare again, but the Yankee fleet began firing their guns and sending up signal rockets. They at once slipped their anchor chains, leaving the anchors behind, and made for the sea. Our commander gave orders to go ahead full speed, and keeping the helm a-port, and steering by the compass, I noticed that we were going at right angles across the river. I saw a ship on the starboard bow, the captain being on the port side. I called his attention to it, but we missed this vessel by 8 or 10 ft. We cruised about the river all night, but met no more ships. When daylight came we saw the Yankee fleet getting out over the bar into the gulf. Looking up stream above us we noticed that one of their vessels had not succeeded in getting out, and that we were between her and safety. We captured her and brought her up to the city and anchored her opposite the third district ferry landing on the Algiers side.

"I was not on the Manassas on her succeeding trips, but would like to say a word as to what became of her. During the Spanish-American war a northern paper stated that Admiral Dewey, then a captain, had sunk her during the fight at the forts, but this was an error. I was in this fight, stationed on board the flagship Louisiana, Commodore Mitchell and Capt. McIntyre, commanding. This vessel was manned by a company of the Crescent artillery and a part of a company of Grivot's artillery, of which I was first lieutenant. The Louisiana was anchored in the stream about 300 yds. above Fort St. Philip, and the Manassas was tied to the bank abreast of us, on the Fort Jackson side, and this was the position we occupied the night of the battle. Two days before the battle Lieut. Johnson came aboard in a boat with dispatches for Commodore Mitchell. Lieut. Johnson told us that from the information he had gathered, the federals were going to attack us within two days. Capt. McIntyre wanted to anticipate them, and remarked to Commodore Mitchell: 'Commodore, let us go down and fight the Yankees.' The Commodore's answer was a short 'No.' Capt. McIntyre had both arms shot off and one leg broken in the fight, and was taken off the ship into Fort St. Philip the morning after the battle. The engagement began at 2 o'clock at night, and lasted until daylight, but the enemy's ships had passed through our line. We had the two best ships left, the Louisiana, sixteen guns, and the McCray, ten guns, and I suggested to Commodore Mitchell that we run them to Mobile. I said that I would pilot them, as I knew the route, either by day or night, in case we had to run through the blockading fleet. I got the same answer that Capt. McIntyre did two days before, a short 'No.'

"If this brave captain had been in charge of the fleet I think we would have succeeded in preventing the Yankee fleet from getting through our lines. One federal ship, the Winona, commanded by Capt. Schley, now admiral, was sunk by the confederate gunboat Stonewall Jackson, but our ships were but little damaged. They were all sunk or set fire to by their own crews during and after the fight, some never having left their moorings. This was the case with the Manassas. Orders were given to abandon and blow up our vessel, the Louisiana, which we did, and along with the officers and crews of the other vessels, we started on a long march of eighty-five miles to the city, on the right bank of the river. I met Capt. Warley of the Manassas on the way, and marching together, I asked him what execution he had done during the fight. He replied that he had done nothing, but had the water supply pipe cut and let her sink at her mooring. Thus ingloriously ended the famous ram Manassas."

PHILADELPHIA BUSINESS NOTES.

Philadelphia, July 8.—The Asbestos Manufacturing Co. of Philadelphia will erect a new plant at Port Kennedy, Montgomery county, Pa., consisting of a three-story main building, 67x265 ft.; boiler house, 20x30 ft.; dryer house, 40x80 ft.; four-story elevator building, 30x60 ft. The plant is to have modern equipment throughout. One of the products of the company is asbestos pipe and boiler coverings and packings, and these are extensively used on vessels as well as in ship yards. The cost of the new buildings will aggregate $250,000 and it is expected they will be completed this year.

The demand for Tubal manganese bronze, manufactured by Paul S. Reeves & Son of Philadelphia, has increased wonderfully of late and the metal is being more widely used in ship yards than ever before. Tubal manganese bronze is especially adapted for propellers, piston rods and all castings requiring high ultimates. The firm supplies the metal in ingots or castings up to 20,000 lbs. in weight.

The expanded metal lockers made by Merritt & Co., Ridge avenue, Philadelphia, are not made of wire or steel rods, as some persons imagine, but are made of sheet steel cut and opened into diamond-shaped meshes having no joints or connections. The lockers are easily cleaned on shipboard and possess unusual strength. They have been put in almost all the vessels recently built on the Delaware.

Thomas C. Warley & Co., manufacturers of Warley's boiler cleansing compounds, have removed from South Water to 221 South Front street. The company has taken a larger building, has installed new appliances and made other improvements, thereby permitting it to almost double its manufacturing capacity. The Warley boiler compound is having a steadily increasing sale and is largely used in marine circles.

Sand Sucker for Sale.

For Sale—Sand sucker of about 175 tons capacity. Equipped with 8-inch pump. In first-class condition, ready for business. Price right. Address 35 Chene St , Detroit, Mich.
July 23

"Seaboard Steel Castings"

A Guarantee of Quality.

Open Hearth Steel Castings of the Highest Grade for Locomotive, General Machinery and Shipbuilding Work.

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FECUNDITY OF THE DEEP SEA.

It has been until recently the prevalent impression that at great depths in the ocean no organic life could exist, for no light penetrates there and the pressure of water is very great. As a matter of fact the pressure is so great that ordinary articles of wood are compressed to half their original size if lowered to a depth of 3,000 ft. If a human being were suddenly exposed to the pressure of water at that depth he would be compressed to the thinness of paper. A diver at the depth of 10,000 ft. would have weight upon him equal to several hundred of the greatest and heaviest locomotives. There are depressions very much deeper, however, and soundings have been made establishing depths of more than 22,000 ft. near the Island of St. Thomas in the Atlantic and of almost 27,000 ft. near the Japanese coast.

Great forests of seaweed cover the bottom of the ocean and reach from the greatest depth well towards the surface. In these forests there is life more diversified than in the primeval forests of the tropics. Millions of living things, some of them of enormous size, find their food in the varied plant life of the deep. Deep sea fish have been brought up in the deep sea dragnet invented by Prince Albert of Monaco. A curious circumstance connected with deep sea fish is that none of them have ever been brought up alive. Recent deep sea explorations reveal the fact that the ocean still contains immeasurable treasures which await development and utilization. The most fertile acre of cultivated land is a sterile desert compared with an acre of the surface of the deep sea bottom.

SHIP BUILDING IN THE BATH DISTRICT.

The wooden ship building industry of the Bath district for the past six months has held up to the average and the prospects for the remainder of the year appear much brighter than for six months just passed. Since Jan. 1 there have been launched four barges with a total gross tonnage of 6,324, and nine schooners with a tonnage of 10,201, making tonnage launched thus far 16,525. For the corresponding period in 1902 there were launched five schooners with a total tonnage of 6,912, two barges totaling 3,833 tons, one ship of 3,381 tons, one yacht of 528 tons, one tug of 110 tons and two steamers aggregating 2,304 tons, making the sum total of 17,078 tons launched for the six months. Thirteen vessels have been launched this year, as against eleven for the corresponding period last year, but the tonnage this year has, thus far, fallen 553 tons below that of a year ago.

SHIP BUILDING IN MAINE.

Business at other Maine points, as well as Bath, is quite brisk. Nearly all the ship yards have work ahead. The Bath Iron Works is giving steady employment to 1,000 men. Three steel tugs are under construction—one for New York parties and two for the New York, New Haven & Hartford railroad. The tugs are each 122 ft. long and will cost $80,000 each. Work is also steadily progressing on the battleship Georgia and on a steel caisson for the Kittery navy yard.

The Kelley-Spear Co. has recently launched a large wrecking lighter, and has several vessels under contract, including a four-masted schooner of 700 tons for Gray, Ireland & Co. of Baltimore, to be commanded by Capt. C. E. Bennett of that city, now master of the schooner Joseph Hoskins; a three-masted schooner for Charles S. Hirsch of New York; a four-master of 2,500 tons capacity for John S. Emery & Co. of Boston, to be commanded by Capt. Coombs, now of the schooner Calumet; a tugboat for the Staples Coal Co. of Taunton, named the Quequechan, and a flat-bottomed lighter of 820 tons gross, to cost $30,000, for the southern lumber trade.

Percy & Small are building a five-masted schooner for William F. Palmer of Dorchester, Mass., to be launched in August. E. S. Crosby is getting out the keel for a 1,300-ton four-masted schooner. The New England Co. is building a four-masted schooner for James B. Drake of Bath, and will probably contract to build two others of the same type. At Phippsburg, near Bath, F. S. Bowker is building a good sized schooner.

At Waldoboro a large five-masted schooner is being built for the Palmer fleet, to be immediately followed by another big Palmer schooner. At Machias and Milbridge three-masted schooners are being built. Belfast has two four-masted schooners in process of construction and another in prospect. Bangor has a 1,000-ton four-master under construction.

At Rockland Cobb, Butler & Co. are building a 700-ton four-masted schooner for Capt. Frederick C. Hall of Rockland, to be launched in October, and the same firm will soon lay the keel for a duplicate of the famous four-masted schooner Jacob M. Haskell, known all along the coast as "the flying Haskell," on account of her fast sailing. The new schooner will measure about 1,780 tons, and will be launched late in November. Crowell & Thurlow of Boston are to be the managing owners. Cobb, Butler & Co. will also build a steamboat for the Vinalhaven & Rockland Steamboat Co. I. L. Snow & Co. of Rockland have laid the keel for a three-masted schooner.

WHITE OAK TIMBER AND LUMBER.

The Marine Review is often in receipt of inquiries from ship builders, dock builders and others requiring oak timber, or planking, such as:

"Where can we get white oak timber?"

"Can you give us the address of a good concern that furnishes white oak planking?"

"We want considerable white oak dimension stuff on short notice; can you inform us where we can obtain same?"

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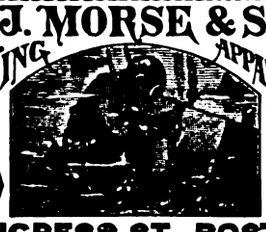

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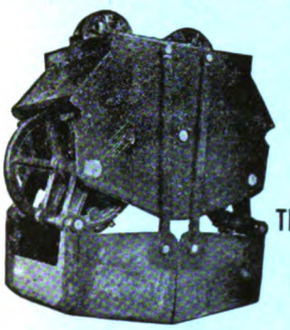

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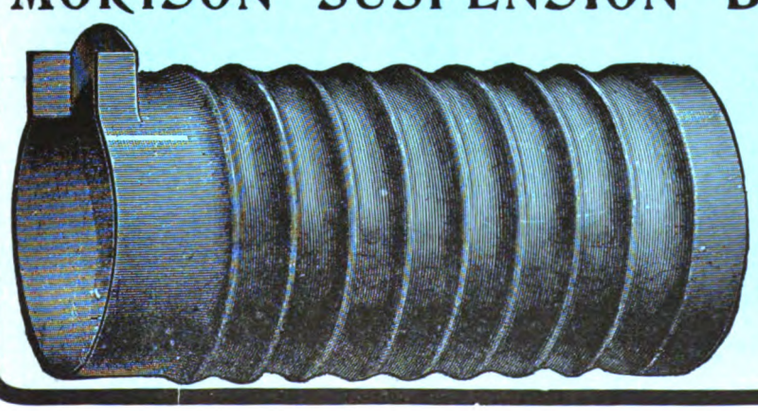

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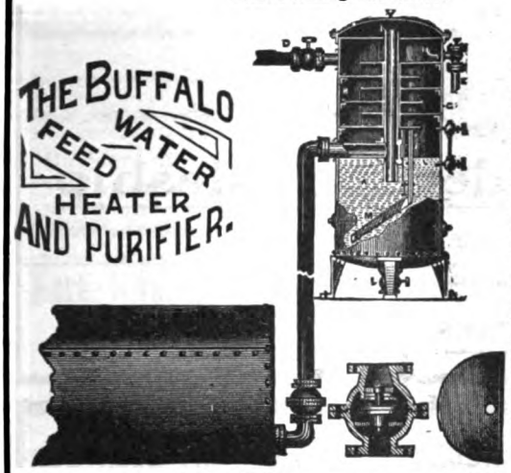

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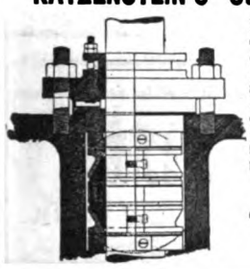

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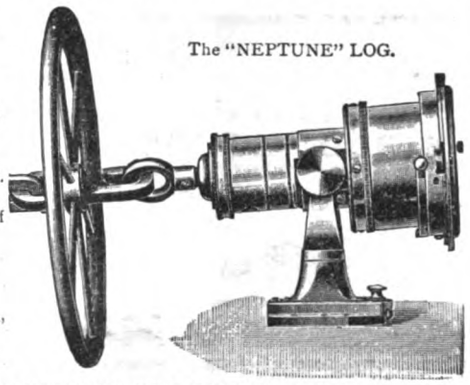
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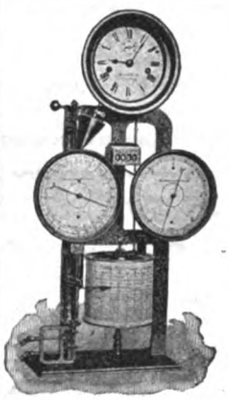

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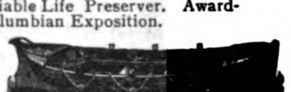

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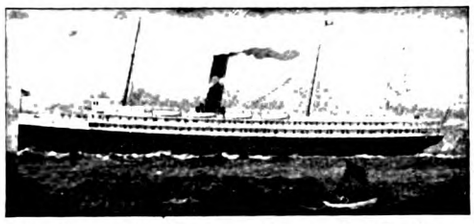

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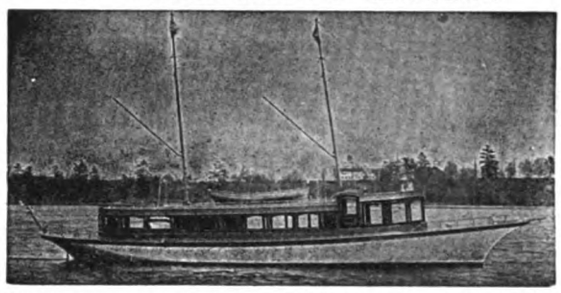

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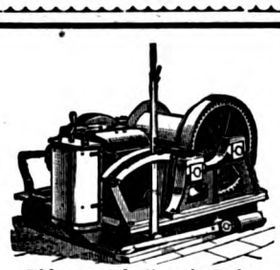

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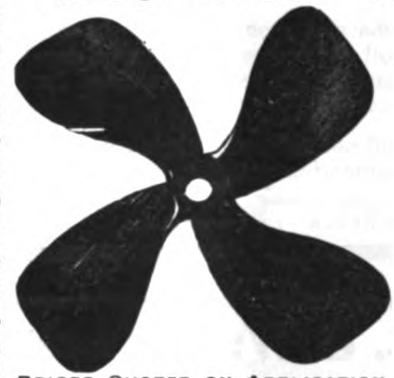

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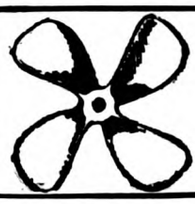

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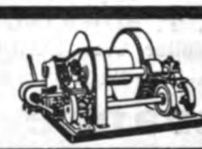

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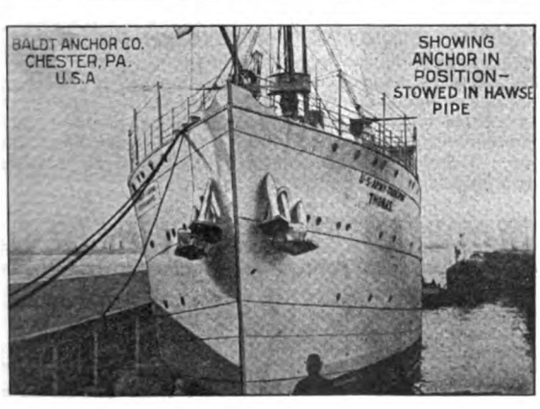

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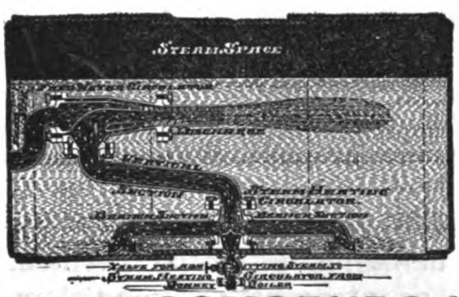

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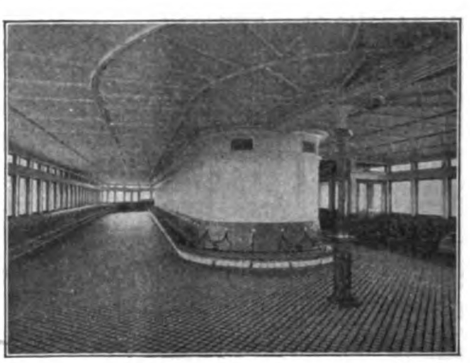

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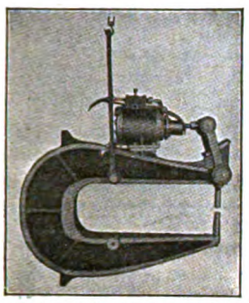

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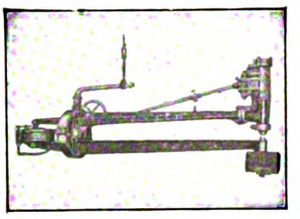

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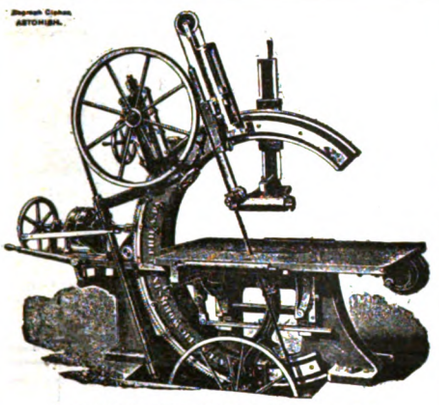

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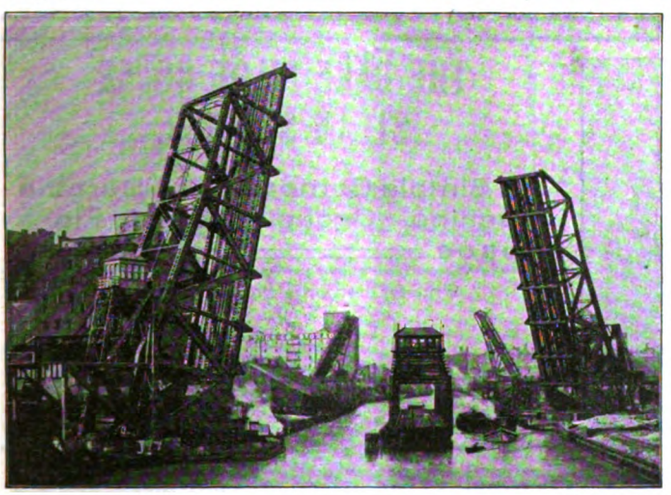

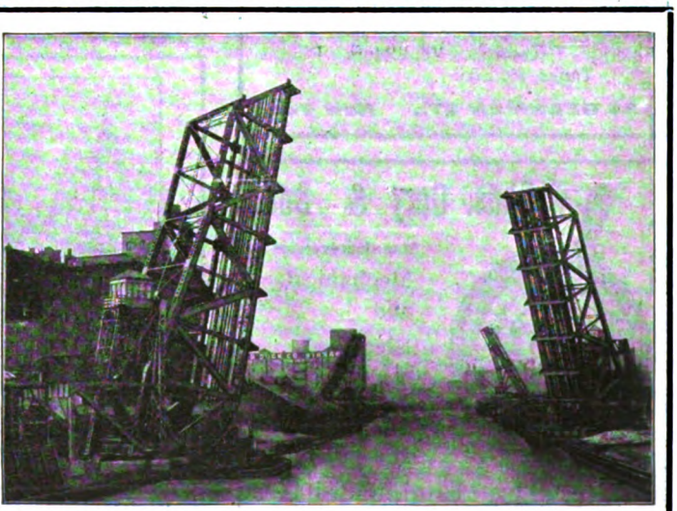

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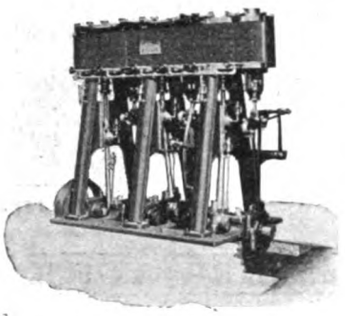

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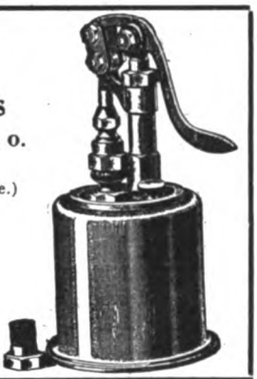

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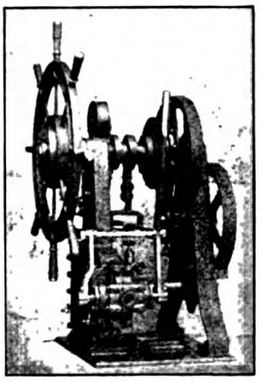

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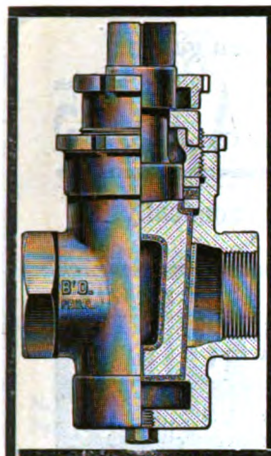

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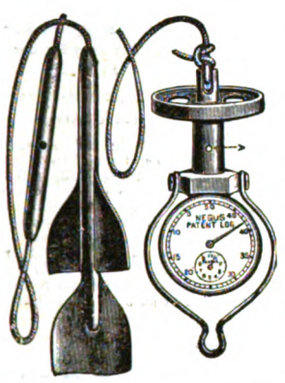

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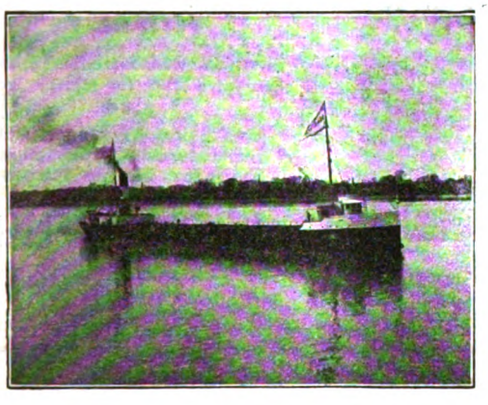

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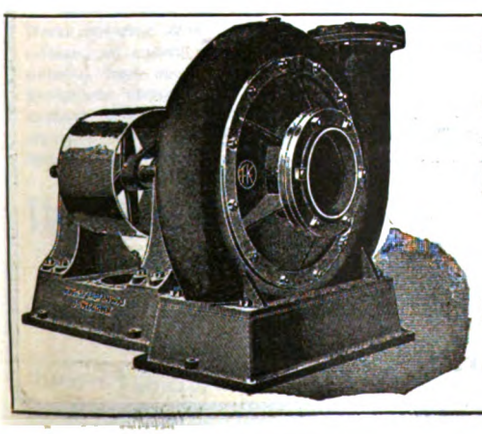

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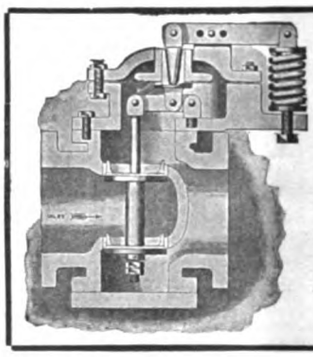

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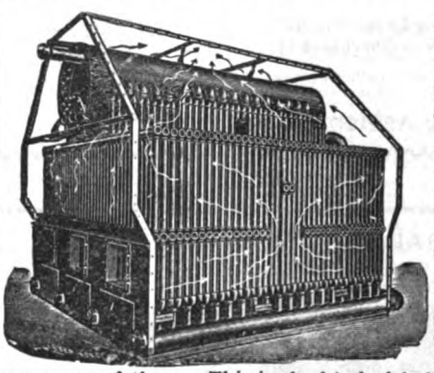

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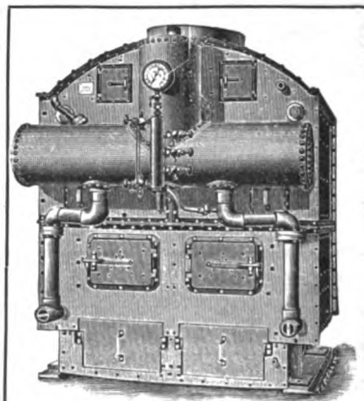

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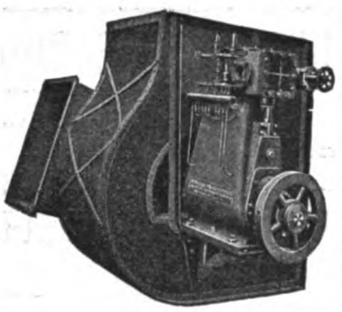

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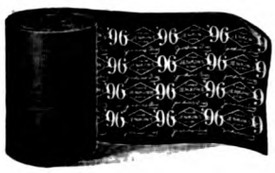

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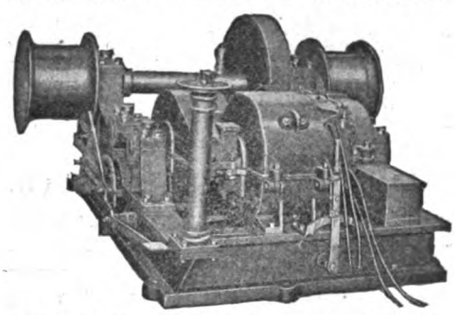

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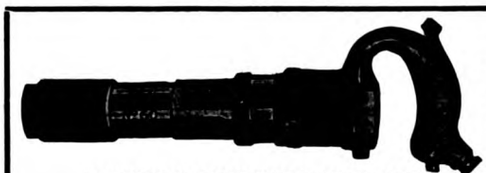

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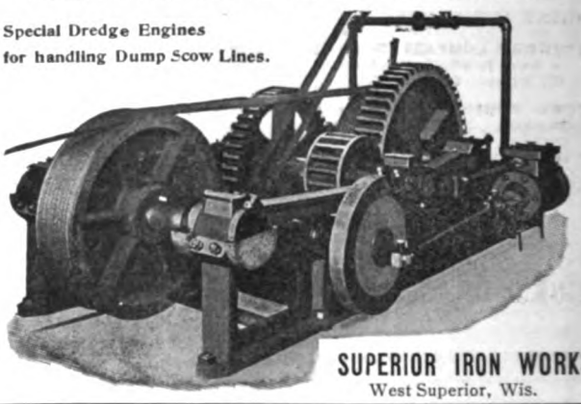

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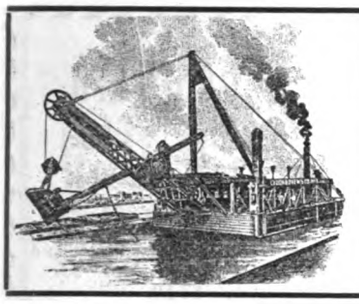

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U. S. Engineer Office, Detroit, Mich., June 18, 1903. Sealed proposals for building concrete superstructure on main pier at Sand Beach harbor of refuge, Mich., will be received here until 3 P. M., standard time, July 18, 1903, and then publicly opened. Information furnished on application. LANSING H. BEACH, Major, Engrs. July 16

U. S. Engineer office, Jones Bldg. Detroit, Mich., June 23. 1903. Sealed proposals for hire of two or three dredging plants for use in lower Lake Huron, St. Clair River and Lake, and upper Detroit River, will be received here until noon (standard time) July 23, 1903, and then publicly opened. Information furnished on application. W. H. BIXBY, Major, Engrs. July 16

Sealed proposals will be received at the office of the Light House Engineer, Buffalo, N. Y., until 12 o'clock, M., Friday the 17th day of July, 1903, and then opened, for furnishing the materials and labor of all kinds necessary for establishing a light and fog-signal station on the new pier head at the end of the west breakwater at Ashtabula, Ohio, in accordance with specifications, copies of which, with blank proposals and other information, may be had upon application to Maj. T. A. BINGHAM, U. S. A., Engineer, Tenth Light House District. July 9

U. S. Engineer Office, Witherspoon Building, Philadelphia, Pa., June 18, 1903. Sealed proposals for constructing two steel, twin-screw, suction dredges, will be received here until 12 noon, July 18, 1903, and then publicly opened. Proposals for constructing both dredges or one will be received. Information furnished on application. J. C. SANFORD, Capt Engrs. July 9

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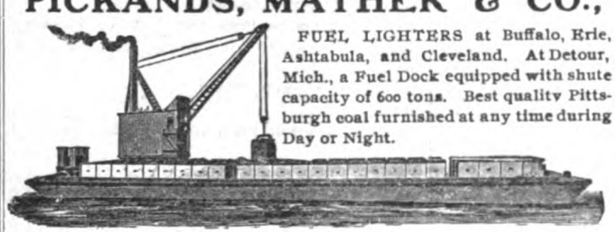

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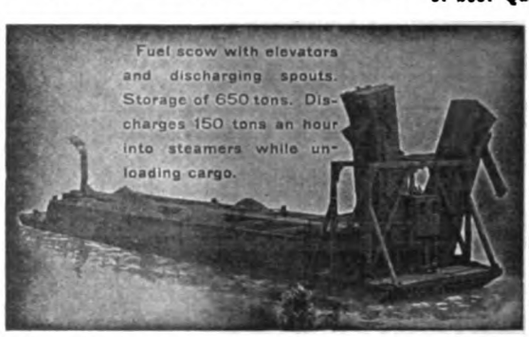
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ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Electro-Dynamic Co. .....Philadelphia.
Garrett-Cromwell Engineering Co.....Cleveland.
Gaskin, Edward .....Buffalo.
Hunt, Robt. W. & Co. .....Chicago.
Kidd, Joseph .....Duluth, Minn.
Logan, Robert .....Cleveland.
Mosher, Chas D. .....New York.
Newman, R. L. .....New York.
Pittsburg Testing Laboratory, Ltd.....Pittsburg.
Powell, Ambrose V. .....Chicago.
Roelker, H. B. .....New York.
Sadler, Perkins & Field.....New York.
Wood, W. J. .....Chicago.

EVAPORATING AND DISTILLING APPARATUS.

Reilly Repair & Supply Co., James....New York.

FANS FOR VENTILATION, EXHAUST, ETC.

Buffalo Forge Co. .....Buffalo.
Sturtevant, B. F. Co. .....Boston.

FEED WATER PURIFIERS AND HEATERS.

Learmonth, Robert .....Buffalo.
Reilly Repair & Supply Co., James.....New York.
Ross Valve Co. .....Troy, N. Y.

FIXTURES FOR LAMPS, OIL AND ELECTRIC.

General Electric Co. .....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

FORGES.

Buffalo Forge Co. .....Buffalo.
Sturtevant, B. F. Co. .....Boston.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co. .....Cleveland.
Fore River Ship & Engine Co. .....Quincy, Mass.
Macbeth Iron Co.....Cleveland.

FLUE WELDING.

Fix's, S. Sons .....Cleveland.

FURNACES FOR BOILERS.

Continental Iron Works.....New York.

FUELING COMPANIES AND COAL DEALERS.

Castner, Curran & Bullitt (Pocahontas) ....Phila.
Graham Coal & Coke co., Ldt.....Detroit.
Hanna, M. A. & Co. .....Cleveland.
Pickands, Mather & Co. .....Cleveland.
Pittsburg Coal Co. .....Cleveland.
Rochester & Pittsburg Coal & Iron Co. ....Buffalo.
Smith, Stanley B. & Co. .....Detroit.
Smith Coal & Dock Co., Stanley B.....Toledo, O.
Youghiogheny & Lehigh Valley Coal Co...Chicago.

GASKETS, RUBBER.

New York Belting & Packing Co.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co. ..New York.

GAS AND GASOLINE ENGINES.

Chase Machine Co. .....Cleveland.

GAGES, STEAM AND VACUUM.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Lunkenheimer Co.....Cincinnati.

GRAPHITE.

Dixon Crucible Co., Joseph .....Jersey City, N. J.

HAMMERS, STEAM.

Chase Machine Co. .....Cleveland.

HARDWARE, SHIP.

Topky Brothers .....Ashtabula, O.

HATCH GEARS.

"Long-Arm" System Co. .....Cleveland.

HEATING APPARATUS.

Buffalo Forge Co. .....Buffalo.
Sturtevant, B. F. Co. .....Boston.

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co., Inc. ....Cleveland.
Chase Machine Co. .....Cleveland.
Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....New York.
Hyde Windlass Co. .....Bath, Me.
Lidgerwood Mfg. Co.....New York.
Marine Iron Co. .....Bay City.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

HOSE FITTINGS.

Farnan Brass Works. .....Cleveland.

HOSE, RUBBER.

New York Belting & Packing Co.....New York.

HYDRAULIC MACHINERY.

Watson-Stillman Co., The.....New York.

ICE MACHINERY.

American Linde Refrigerating Co. .....New York.
Roelker, H. B. .....New York.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.

INJECTORS.

American Injector Co.....Detroit.
Crane Co. .....Chicago.
Jenkins Bros. .....New York.
Lunkenheimer Co. .....Cincinnati.
Penberthy Injector Co. .....Detroit, Mich.

INSURANCE, MARINE.

Brown & Co. .....Buffalo.
Brown, W. W. .....Cleveland.
Dunham, R. J. .....Chicago.
Elphicke, C. W. & Co. .....Chicago.
Fleming & Co., P. H. .....Chicago
Hawgood & Co., W. A. .....Cleveland.
Helm & Co., D. T. .....Duluth.
Hutchinson & Co. .....Cleveland.
Insurance Co. of North America....Philadelphia
McCarthy, T. R. .....Montreal.
McCurdy, Geo. L. .....Chicago.
Mitchell & Co. .....Cleveland.
Peck, Chas. H. & W. F. ...New York and Chicago.
Richardson, W. C. .....Cleveland.
Sullivan, D. & Co. .....Chicago.
Weeks, F. H. .....New York.

IRON ORE AND PIG IRON.

Bourne-Fuller Co. .....Cleveland.
Hanna, M. A. & Co. .....Cleveland.
Pickands, Mather & Co. .....Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Warrington Iron Works .....Chicago.
Willard, Chas. P. .....Chicago.

LIFE FLOATS.

Carley Life Float Co. .....New York.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong Cork Co. .....Pittsburg.
Drein, Thos. & Son .....Wilmington, Del.
Kahnweiler's Sons, D. .....New York.
Lane & DeGroot .....Long Island City, N. Y.
Marine Construction & Dry Dock Co.....
.....Mariner's Harbor, S. I., N. Y.

LIGHTS, SIDE AND SIGNAL.

Helvig, H. A. J. .....New York.
Russell & Watson .....Buffalo.

LOGS.

Negus, T. S. & J. D. ..... New York.
Nicholson Ship Log Co. .....Cleveland.
Walker & Sons, Thomas .....Birmingham, Eng.
Also Ship Chandlers.

LUMBER.

Martin-Barriss Co. .....Cleveland.
Moran Bros. Co. .....Seattle, Wash.
Shurick, F. S. .....New York

MACHINISTS.

Chase Machine Co.....Cleveland.
Macbeth Iron Co. .....Cleveland.
Union Machine & Boiler Co.....Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc. .....Philadelphia.

MACHINERY, NEW AND SECOND HAND.

Bowler & Co. Geo. H. .....Cleveland.

MAN-HOLES, SWING DOORS, ETC.

"Long-Arm" System Co. .....Cleveland.

MARINE RAILWAYS, BUILDERS OF

Crandall & Son, H. I. .....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W. .....New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co. .....Cleveland
Bloomsburg & Co., H. .....Baltimore, Md.
Buffalo Forge Co. .....Buffalo.
Detroit Ship Building Co. .....Detroit.
Sturtevant, B. F. Co. .....Boston.

METALLIC PACKING.

Hayden Mfg. Co., N. L. .....Columbus, O.
Katzenstein, L. & Co. .....New York.
U. S. Metallic Packing Co. .....Philadelphia.

METAL POLISH.

Bertram's Oil Polish Co. .....Boston.

MOTORS, GENERATORS—ELECTRIC.

Buffalo Forge Co. .....Buffalo.
Electro-Dynamic Co. .....Philadelphia.
Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....Schenectady, N. Y.
"Long Arm" System Co. .....Cleveland.
Sturtevant, B. F. Co. .....Boston.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

NAUTICAL INSTRUMENTS.

Bliss, John & Co. .....New York.
Negus, T. S. & J. D. ..... New York.
Ritchie, E. S. & Sons .....Brookline, Mass.

NAVAL ARCHITECTS.

Gaskin, Edward .....Buffalo.
Kidd, Joseph .....Duluth, Minn.
Logan, Robert .....Cleveland.
Mosher, Chas. D. .....New York.
Newman, R. L. .....New York.
Sadler, Perkins & Field.....New York
Wood, W. J. .....Chicago.

OAKUM.

DeGrauw, Aymar & Co. .....New York.
Stratford Oakum Co.....Jersey City, N. J.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph .....Jersey City, N. J.
Standard Oil Co. .....Cleveland.

PACKING.

Crane Co. .....Chicago.
Hayden Mfg. Co., N. L. .....Columbus, O.
Jenkins Bros. .....New York.
Katzenstein, L. & Co. .....New York.
New York Belting & Packing Co.....New York.
United States Metallic Packing Co. ....Philadelphia.

PAINTS.

Baker, Howard H. & Co. .....Buffalo.
Berry Bros., Ltd. .....Detroit.
Mohawk Paint & Chemical Co.....Norwich, Conn.
New Jersey Zinc Co. .....New York.
Topky Brothers .....Ashtabula, O.
Upson-Walton Co. .....Cleveland.

PATENT ATTORNEYS.

Thurston & Bates .....Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc. .....Philadelphia.

PIPE—BRASS AND COPPER, IRON PIPE SIZE.

Waterbury Brass Co.....New York.

PIPE, WROUGHT IRON.

Bourne-Fuller Co .....Cleveland.
Crane Co .....Chicago.
Macbeth Iron Co.....Cleveland.

PLANING MILL MACHINERY.

Atlantic Works, Inc. .....Philadelphia.

PLUMBING, MARINE.

Mott, J. L., Iron Works .....New York.
Reilly Repair & Supply Co., James....New York.
Sands, Alfred B. & Son .....New York.

PNEUMATIC TOOLS.

Allen, John F., ... New York.
Chicago Pneumatic Tool Co. .....Chicago.

POLISH FOR METALS.

Bertram's Oil Polish Co.....Boston.

POWER DOORS AND HATCHES.

"Long-Arm" System Co. .....Cleveland.

PRESSURE REGULATORS.

Kieley & Mueller .....New York
Ross Valve Co. .....Troy, N. Y.

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BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

PROPELLER WHEELS.

American Ship Building Co. .....Cleveland
Atlantic Works .....East Boston, Mass.
Bath Iron Works, Ltd. .....Bath, Me.
Cramp, Wm. & Sons.....Philadelphia.
Crescent Ship Yard Co .....Elizabethport, N. J.
Detroit Ship Building Co. .....Detroit.
Fore River Ship & Engine Co. .....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Hyde Windlass Co. .....Bath, Me.
Jenks Ship Building Co. .....Port Huron, Mich.
Lockwood Mfg. Co. .....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
MacKinnon Mfg. Co. .....Bay City, Mich.
Maryland Steel Co. .....Sparrow's Point, Md.
Milwaukee Dry Dock Co. .....Milwaukee.
Moran Bros. Co. .....Seattle, Wash.
Neafie & Levy Ship & Engine Bldg. Co.....Phila.
Newport News Ship Bldg. Co...Newport News, Va.
Phosphor Bronze Smelting Co., Ltd...Philadelphia.
Pusey & Jones Co. .....Wilmington, Del.
Risdon Iron Works .....San Francisco.
Roelker, H. B. .....New York.
Sheriffs Mfg. Co. .....Milwaukee.
Superior Ship Building Co.....Superior, Wis.
Thropp & Sons Co., J. E. .....Trenton, N. J.
Trout, H. G. .....Buffalo.
United States Shipbuilding Co.....New York.

PROJECTORS, ELECTRIC.

Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F. Mfg. Co. .....New York.
Clyde Machine Works .....Chicago.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Wks. Oswego, N. Y.
Long Arm System Co. .....Cleveland.

PUNCHES, RIVETERS, SHEARS.

Chicago Pneumatic Tool Co. .....Chicago.

REFRIGERATING APPARATUS.

Roelker, H. B. .....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register .....Cleveland.
Record of American & Foreign Shipping.New York.

RELEASING HOOKS FOR DETACHING BOATS.

Standard Automatic Releasing Hook Co. New York.

RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co. .....Cleveland.

RANGES.

Russell & Watson .....Buffalo.

RIVETS—BRASS AND COPPER.

Waterbury Brass Co.....New York.

RUBBER INSULATED WIRES.

Roebling's Sons, Jno. A...New York and Cleveland.

SAFETY VALVES.

American Steam Gauge Co. .....Boston.
Ashton Valve Co.....Boston.
Hayden Mfg. Co., N. L.....Columbus, O.
Lunkenheimer Co. .....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co. .....Buffalo.
Upson-Walton Co. .....Cleveland.
Wilson & Silsby .....Boston.

SALVAGE COMPANIES.

See Wrecking Companies.

SEARCH LIGHTS.

Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co. .....Cleveland.

SHIP BUILDERS.

American Ship Building Co. .....Cleveland.
Atlantic Works .....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Buffalo Dry Dock Co. .....Buffalo.
Columbia Iron Works .....Port Huron.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co. .....Toledo, O.
Chicago Ship Building Co.....Chicago.
Crescent Ship Yard Co .....Elizabethport, N. J.
Detroit Ship Building Co. .....Detroit.
Fore River Ship & Engine Co. .....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Jenks Ship Building Co. .....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Marine Construction & Dry Dock Co.....
.....Mariner's Harbor, S. I., N. Y.
Maryland Steel Co .....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co. .....Seattle, Wash.
Neafie & Levy Ship & Engine Bldg. Co.....Phila.
Newport News Ship Bldg. Co....Newport News, Va.
Pusey & Jones Co. .....Wilmington, Del.
Risdon Iron Works .....San Francisco.
Roach's Ship Yard .....Chester, Pa.
Shipowners Dry Dock Co.. .....Chicago.
Smith & Son, Abram .....Algonac, Mich.
United States Shipbuilding Co.....New York.
Warrington Iron Works .....Chicago.
Willard, Chas. P. & Co. .....Chicago.

SHIP CHANDLERS.

Baker, Howard H. & Co. .....Buffalo.
Moran Bros. Co. .....Seattle, Wash.
Reilly Repair & Supply Co., James....New York.
Upson-Walton Co. .....Cleveland.

SHIP LANTERNS AND LAMPS.

Helvig, H. A. J.....New York.
Russell & Watson.....Buffalo.

SHIP TIMBER.

Martin-Barriss Co. .....Cleveland.
Moran Bros. Co.....Seattle, Wash.
Shurick, F. S. .....New York

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co. .....Jersey City, N. J.

SPARS—LARGE SIZES.

Moran Bros. Co.....Seattle, Wash.

STAYBOLTS, IRON OR STEEL, HOLLOW, OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Elwell, Jas. W. & Co.....New York.
Holmes, Samuel.....New York.
King, Rufus S.....New York.
McCarthy, T. B.....Montreal, Can.
Newman, R. L.....New York.
Weeks, F. H.....New York.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line.....New York.
Cleveland & Buffalo Transit Co .....Cleveland.
Erie & Western Trans. Co. .....Buffalo.
Goodrich Trans Co.. .....Chicago.
International Nav. Co.....Philadelphia.
Pere Marquette R. R. & S. S. Line.....Milwaukee.
Red Star Line.....New York.

STEEL CASTINGS.

Seaboard Steel Casting Co.....Chester, Pa.
Macbeth Iron Co.....Cleveland.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
Chase Machine Co. .....Cleveland.
Dake Engine Co.....Grand Haven, Mich.
Detroit Shipbuilding Co.....Detroit.
Electro-Dynamic Co.....Philadelphia.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Sheriff Mnfg. Co.....Milwaukee.

STOCKS, BONDS, SECURITIES.

Brown, W. W.....Cleveland.
Fahey & Co.....Cleveland.

SUBMARINE DIVING APPARATUS

Morse & Son, A. J.....Boston.
Schrader's Son, A.....New York.

SURVEYORS, MARINE.

Gaskin, Edward.....Buffalo.
Newman, R. L.....New York.
See, Horace.....New York.
Wood, W. J.....Chicago.

TESTS OF MATERIAL.

Hunt, Robert W. & Co.....Chicago.
Pittsburg Testing Laboratory, Ltd.....Pittsburg.

TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co.....New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F.....New York.
Chicago Pneumatic Tool Co.....Chicago.
Watson-Stillman Co.....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc.....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co.....Providence, R. I.
Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co....Kingston, Ont.
Midland Towing & Wrecking Co., Ltd.Midland, Ont.

TRAPS, STEAM.

Kieley & Mueller.....New York.
Lunkenheimer Co.. .....Cincinnati.

TRUCKS.

Boston & Lockport Block Co..... .....Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co .....Pittsburg, Pa.
Waterbury Brass Co.....New York.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Bordo, L. J.....Philadelphia.
Crane Co. .....Chicago.
Farnan Brass Works .....Cleveland.
Hayden Mfg. Co., N. L.....Columbus, O.
Jenkins Bros.....New York.
Kieley & Mueller.....New York.
Lunkenheimer Co.....Cincinnati.
Ross Valve Co. .....Troy, N. Y.

VALVES FOR WATER AND GAS.

Ross Valve Co. .....Troy, N. Y.

VARNISHES.

Berry Brothers, Ltd.....Detroit.
New Jersey Zinc Co.....New York.
Also Ship Chandlers.

VESSEL CASTINGS.

American Ship Building Co.....Cleveland.
Macbeth Iron Co.....Cleveland.

VESSEL AND FREIGHT AGENTS.

Boland, John J.....Buffalo.
Brown & Co.....Buffalo.
Brown, W. W.....Cleveland.
Dunham, R. J. .....Chicago.
Elwell, Jas. W. & Co.....New York.
Elphicke, C. W & Co.....Chicago.
Fleming & Co.; P. H. .....Chicago.
Hall & Root.....Buffalo.
Helm & Co., D. T. .....Duluth.
Hawgood & Co., W. A.....Cleveland.
Holmes, Samuel.....New York.
Hutchinson & Co.....Cleveland.
King, Rufus S.....New York.
McCarthy, T. B.....Montreal.
Newman, R. L.....New York.
Mitchell & Co.....Cleveland.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.
Weeks, F. H.....New York.

VENTILATING APPARATUS FOR SHIPS.

Buffalo Forge Co. .....Buffalo.
Sturtevant, B. F. Co.....Boston.

WIRE—BRASS AND COPPER.

Waterbury Brass Co.....New York.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co.....Buffalo.
DeGrauw, Aymar & Co. .....New York
Upson-Walton Co.....Cleveland.

WHISTLES, STEAM.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Farnan Brass Works .....Cleveland.
Lunkenheimer Co.....Cincinnati.

WHITE METAL—SHEETS, RODS AND WIRE.

Waterbury Brass Co.....New York.

WINDLASSES.

American Ship Windlass Co.....Providence, R. I.
American Ship Building Co. .....Cleveland
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.

WINCHES.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co.....Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc.....Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co....Kingston, Ont.
Midland Towing & Wrecking Co., Ltd.Midland, Ont.

YACHT AND BOAT BUILDERS.

Dreis, Thos. & Son.....Wilmington, Del.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & Dry Dock Co. ...New York.
Truscott Boat Mfg. Co. .....St. Joseph, Mich.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

YAWLS.

Dreis, Thos. & Son.....Wilmington, Del.
Lane & DeGroot.....Long Island City, N. Y.

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No. 26, N Y & Bost Ex....	*7:40am	*8:00am
No. 40, Toledo & Buff Ac.	†10:00am	†10:40am
No. 32, Fast Mail	*11:25am	*11:30am
No. 44, Ac via Sandusky..	†1:40pm	.....
No. 46, Southwestern Ex.	....	*3:00pm
No. 106, Conneaut Accom	.....	†4:30pm
No. 6, Lim Fast Mail....	*5:40pm	*5:45pm
No. 26, 20th Cent L. m. ...	*7:40pm	*7:43pm
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No. 16, New Eng Ex.....	*10:30pm	*10:35pm
No. 2, Day Express.	†9:10pm	†9 25pm
No. 126, Norwalk Accom.	†7:50am	.....

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No. 7, Day Express.	.....	†6:10am
No. 15, Bost & Chi Sp.....	*3:10am	*3:15am
No. 19, Lake Shore Lim..	*7:15am	*7:20am
No. 23, Western Express.	*10:30am	*10:35am
No. 33, Southern Express	*12:25pm	....
No. 133, Cleve & Det Ex..	.....	*12:45pm
No. 47, Accomodation.....	†11.20am	†3:00pm
No. 141, Sandusky Accom.	.....	†3:10pm
No. 43, Fast Mail	*4:35pm	*4:40pm
No. 127, Norwalk Accom..	.....	†5:10pm
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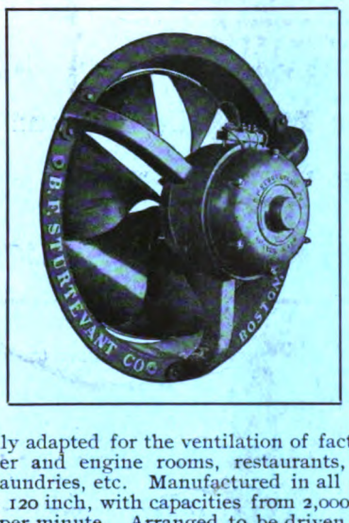

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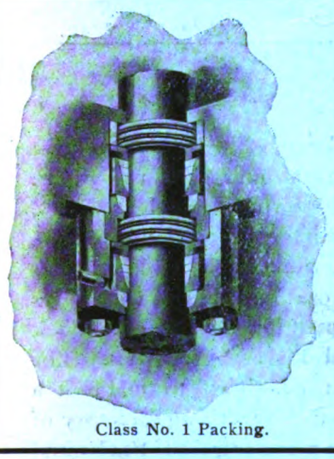

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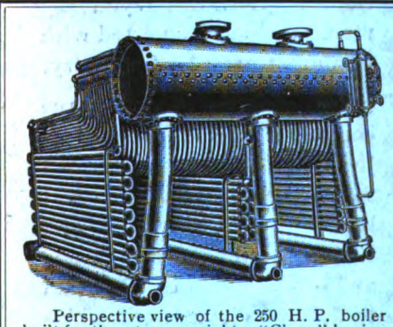

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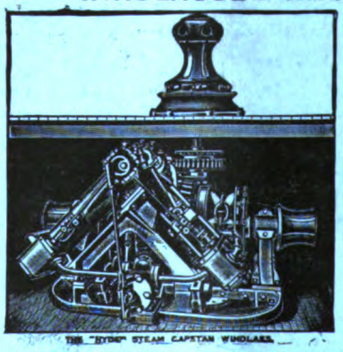

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